LAW AND CONTEMPORARY PROBLEMS

THE PATENT SYSTEM
I

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FOREWORD

The student of law or politics, on first looking into the American patent system, is likely to find that his dominant impression is one of unresolved conflict. The existence of a patent system in the American economy presupposes a reconciliation of competing policies. The reconciliation, however, appears not to have been worked out. Monopoly, especially of the sort that crudely excludes all but the specially privileged from the pursuit of a trade or the practice of an art, was abhorrent to the founders of the American system;[1] at the same time the need to strengthen the nation by stimulating progress in science and useful arts was not to be denied merely because the means at hand was the traditional one of letters patent, of odious memory. The conflict might have been avoided if the framers of the Constitution and the members of the First Congress had sought other means; but the decision to reward inventors by the grant of exclusive rights injected a contradiction of purpose which called for thorough rationalization. There was, indeed, a partial resolution of the inconsistency between monopoly and common right, in that the more obvious evils of monopoly, as revealed by the lessons of the past, were repudiated by the determination that these limited monopolies were to be granted only for useful "inventions" or "discoveries."[2] Plainly, however, the meaning of invention was crucial; for to carry the granting of letters patent beyond the necessities which impelled this compromise with an oppressive tradition was to license and defend encroachment on the public domain.[3]

But there was no definition of invention, either in the Constitutional provision for patents or in the act of Congress implementing it. More than a hundred and fifty years have passed, and the concept of invention remains not only undefined by

[1] See WALTON H. HAMILTON, PATENTS AND FREE ENTERPRISE 18-27 (TNEC Monograph 31, 1941).

[2] *Cf.* the language of the first patent act, 1 STAT. 109-110 (1790).

[3] Thomas Jefferson, the "friend of invention," was keenly aware of the danger. Speaking as a former member of the first patent board, he said: ". . . I know well the difficulty of drawing a line between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not." 6 WRITINGS OF THOMAS JEFFERSON 181 (H. A. Washington, Ed., 1854). He spoke also from personal experience. On one occasion he found himself constrained to pay tribute to the holder of a patent for the privilege of using certain mill machinery, when he was convinced, on the basis of what must be a classic canvass of the prior art, that the essentials of the patented devices had been part of the common store of knowledge since antiquity. *Id.* at 182-183.

Congress but highly controversial. In such circumstances one is justified in asking whether the Founding Fathers really formulated a patent policy, as it is generally taken for granted they did, or whether they simply embraced, without fully reconciling, two not altogether compatible aspirations.

There are doubtless many other instances in which what appear to be comfortably settled policy determinations may turn out, on closer examination, to be attempts to hold on to conflicting desires in the hope that an adjustment will work itself out, or even the hope that cake can be both had and eaten.[4] It is, of course, the boast of the common law that conflicting interests are composed by a case-by-case eclecticism rather than according to any single foreordained policy; and it is characteristic of the administrative state that policy is formulated only in broad terms, to be made explicit in the light of experience and changing circumstances. Yet it is doubtful that there is anything in our experience comparable to the patent system as an example of conspicuous failure of this technique of control to achieve a practicable accommodation of divergent objectives. It is not merely that no reconciling concept of invention has been discovered and consistently applied; more serious is the fact that the courts and the administrative agencies—the two institutions charged with the application of the patent law—are, for reasons which are both ideological and institutional, poles apart in their positions on this fundamental issue.[5]

The seriousness of this irresolution was accentuated when, just a hundred years after the first patent statute, at a time when technology was assuming new importance in American life in general and corporate enterprise in particular, Congress translated the traditional antipathy to restraints of trade into high national policy. Since then we have been deeply concerned not only with the question of what constitutes patentable invention, but also with the uses to which a patent, once granted, may be put. Never before has recognition of the social value of scientific advance been so universal; and, while the same cannot be said of competitive enterprise, the passage of the Sherman Act did infuse the competitive ideal with a new vitality. The chosen instrument for the promotion of technology must be made to serve its purpose, the patentee must be given the full benefit of his grant; but the public domain must be jealously guarded against appropriation, and the competitive system must be defended against any attempt by the patentee to enlarge the scope of his monopoly. Since we have never really decided what we want to do about the areas in which friction attends the effort to apply these principles concurrently, it is not surprising that the reasoning in arguments and judicial decisions in the critical areas tends to go in a circle.

These perennial problems, however, are not the only causes of the current awakening of interest in the patent institution and its effect on the welfare of the nation. Recent years have brought epoch-making changes in the meaning of

[4] It may not be too far-fetched to suggest that there are some social maladjustments which, like neuroses in an individual, may be traced to unresolved conflicts. *Cf.* the idea of a "frustrated community" in RANYARD WEST, CONSCIENCE AND SOCIETY 176 (1945).

[5] See Stedman, *Invention and Public Policy, infra,* esp. note 34, p. 657.

science for humanity and in the institutions through which the benefits of science are to be cultivated and applied. The patent system cannot be adjusted to these developments without undergoing new stresses, nor without searching reevaluation under the impact of each great change. In this generation we have twice had occasion to consider the effect of the patent system on our ability to wage technological war, and on the costs of the undertaking. The aftermath of the more recent and exacting of these experiences finds science established as a prime national resource, and the national government itself the undisputed leader in research and development. On an unprecedented scale the scientific facilities of colleges and universities are being drafted by both government and industry. The nationalization of industry in foreign countries raises new and important problems of the relation between patents and international trade and policy. And with the announcement that an atomic bomb had been exploded over Hiroshima we were suddenly confronted with a whole new universe of "invention" and exploitation which had developed quite independently of our eighteenth-century program for science, and which seems destined to continue its development largely outside that program.

The patent system has been as unyielding to change as it has been provocative of proposals for change. In precipitating further discussion, therefore, one aims at enlightenment rather than reform. If the patent system invited critical appraisal by the Temporary National Economic Committee before the war,[9] it demands intensive study now. In the hope of contributing to the productiveness of that necessary study, LAW AND CONTEMPORARY PROBLEMS presents this group of eight papers by distinguished observers, and will present a second symposium on the patent system early in 1948.

BRAINERD CURRIE.

[9] HAMILTON, *op. cit. supra*, note 1, at 27.

INVENTION AND PUBLIC POLICY

JOHN C. STEDMAN*

I

PUBLIC INTEREST AND THE PATENT SYSTEM

Despite an occasional mystic who persists in viewing our patent system as a sacred cow, not to be touched, much less slaughtered, I take it there is no serious challenge today of the proposition that the patent system has for its primary purpose the advancement of the public interest and that it must be evaluated in the light of that interest—and, if necessary, changed to promote it. The courts have long recognized this.[1]

In the many and, at times, acrimonious debates and arguments concerning the merits of the patent system, the furtherance of the public interest has been a basic premise. While protagonists and antagonists both, like thunder at dawn, have often produced much noise but little light, the issues have been clear, if the answers have not: Does our present system further or retard the public interest? Would proposed changes make matters better or worse?

First of all, what is the public interest that the patent system is intended to promote? The Constitution gives the answer.[2] It is "to promote the progress of science and useful arts." "Progress," of course, could mean the encouragement and disclosure of research and invention, the objectives most often ascribed to the patent system. Or it could mean encouragement of the use of an invention once it is made. Or it could mean both. I deem it unprofitable, for the purposes of this discussion, to dwell upon the extent to which the framers of the Constitution attached importance to the one or the other, or to such additional objectives as stimulating the production of articles already known and encouraging the introduction of arts and techniques from foreign countries.[3]

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[1] United States v. Vehicular Parking, Ltd., 54 F. Supp. 828, 835 (D. C. Del. 1944); Mercoid Corp. v. Mid-Continent Inv. Co., 320 U. S. 661 (1944). Almost a hundred years ago, in Kendall v. Winsor, 21 How. 322, 329 (U. S. 1858), the Court said:

"Whilst the remuneration of genius and useful ingenuity is a duty incumbent upon the public, the rights and welfare of the community must be fairly dealt with and effectually guarded. Considerations of individual emolument can never be permitted to operate to the injury of these."

[2] U. S. CONST. Art. I, §8.

[3] Considerable study has been given to the economic and social factors that gave rise to the patent system as we know it. Two excellent historical treatises on the subject are HAROLD G. FOX, MONOPOLIES AND PATENTS (1947), and W. H. PRICE, THE ENGLISH PATENTS OF MONOPOLY (1913).

I suggest that what they had in mind, what they conceived to be the needs of the eighteenth century society which provided their frame of reference, is not very important—as long as the language of the Constitution is broad enough to permit patent statutes adequate in scope and terms to achieve the best interests of the public in 1947. The question, in other words, is: what is needed *today* in the way of a patent system to "promote the progress of science and useful arts" in their broadest meaning?

A brief digression is necessary in order to mark out the limits of the present discussion. I accept as axiomatic three propositions which one might well challenge in a discussion of broader scope than this. First, I assume that promotion of the progress of science and useful arts *is* desirable in the public interest.[4] Second, I assume that this public interest is so important that its promotion should be assured by conscious social encouragement, control, and direction, through a patent system or otherwise, and it should not be left entirely to the unstimulated initiative of the individual; in other words, that research constitutes an important natural resource to be developed and exploited as any other important natural resource.[5] Third, I assume it is desirable to maintain an economic and industrial society founded fundamentally upon a policy of free competitive enterprise—founded, that is, upon the proposition that individuals shall have the right and opportunity, subject to reasonable limitations, to enter into any business they see fit and to compete with others.[6]

Turning again to the immediate issue, how does our patent system measure up as a device for promoting the progress of science and useful arts? It will be

[4] That this proposition is at least subject to challenge is evidenced by two things. First, the suggestion is frequently heard that our advances in the technological sciences have so far outstripped our advances in the social sciences that we have developed techniques for destroying ourselves, or at least our civilization as we know it, without developing the means of controlling those techniques so as to prevent their being used for that purpose. Second, to the extent that we expend our energy on matters of material improvement, we may be diverting our efforts from spiritual, social, and aesthetic activities which in the long run might pay greater dividends, in terms of civilization and social organization, than the material advancements we achieve.

[5] This proposition is implicit in the enactment of our patent laws. It has been expressly reaffirmed recently and frequently, especially since the development of the atomic bomb. See VANNEVAR BUSH, SCIENCE THE ENDLESS FRONTIER (1945); NATIONAL RESOURCES PLANNING BOARD, RESEARCH—A NATURAL RESOURCE (1940); Atomic Energy Act of 1946, 60 STAT. 755, 42 U. S. C. A. §1801 (Supp. 1946); SEN. REP. No. 78 on S. 526, National Science Foundation Bill, 80th Cong., 1st Sess. (1947).

[6] Much has been said for and against this proposition on economic grounds. Certainly one thing seems true, and that is that the democratic political system we know and the traditions of liberty and freedom which we cherish cannot long survive except in such an economic climate. As Senator O'Mahoney has pointed out in his *Final Statement* as Chairman of the Temporary National Economic Committee (1941) at p. 16:

"For two generations, the concentration of economic power and wealth has proceeded at such a pace that the welfare of the masses in agriculture and industry has been seriously jeopardized. Small business has been swallowed up by big business and big business is now confronted with the danger of being swallowed up by Government. The way to reverse this trend is not to be found in further expanding the powers of Government, nor in releasing big business from so-called Government interference. The only remedy to save a democratic economy is to be found in making the economy democratic. If we are to avoid an all-powerful Central Government we have no recourse but to reestablish and encourage free, private enterprise, that is to say, private enterprise which will be free from the arbitrary control of private organization as well as of public organization."

helpful to summarize briefly the main features of our patent law.[7] Under it an inventor, *i.e.*, one who has developed something not previously known and which is quite out of the ordinary and not likely to be developed in the run-of-the-mine activities of individuals "skilled in the particular art," receives the assignable right to exclude others from the use of his invention for a period of seventeen years from the date when the patent issues. He also receives by implication the correlative right to refrain from excluding others, for instance by licensing them to use the invention. In return, the inventor must make a clear and public disclosure of his invention, thereby enabling other individuals and the public in general to benefit from it, perhaps through stimulation to new ideas from its disclosure and in any event by use of the invention after the patent expires. The patentee must also clearly define the scope of the invention he claims, a necessary requirement to enable the Patent Office to state just what he is getting by his patent and to acquaint others with the exact boundaries of the field to which the "no trespass" sign applies. To give teeth to the right to exclude, the law permits the patentee to enjoin the use of his invention by those not authorized by him to use it, to sue for damages just as one might sue any trespasser upon one's property, and to treat the unauthorized user as a "constructive trustee" and compel him to account for the benefits he has received from his improper use of the invention.[8]

Patents are not obtainable as a matter of course. The applicant must present his invention to the Patent Office, satisfy that office that it is indeed an invention, that he has adequately disclosed it, and that he has clearly marked out the area in which he asserts exclusive rights. If he does not satisfy the Patent Office, the application is denied without being disclosed to the public and everyone is in the same position as before.[9] If the Patent Office is satisfied, the inventor gets his patent. It does not follow that it is a good patent. Under the law it is merely *prima facie* valid and is subject to attack in the courts on numerous grounds.[10] Thus, the final decision as to whether an inventor is entitled to his seventeen years' right is made by the courts —if the issue ever reaches the courts on the merits.[11]

[7] It has properly been pointed out that "the patent law is not the same thing as the patent system." Kahn, *Fundamental Deficiencies of the American Patent Law*, 30 AM. ECON. REV. 475 (1940). Later discussion, wherein will be noted some of the divergences between the patent law on the books and the patent law in action, will serve to underline this observation.

[8] The right to an accounting for profits has been severely limited by recent legislation, Act of Aug. 1, 1946, c. 726, 60 STAT. 778, 35 U. S. C. A. §70 (Supp. 1946), which limits recovery to a reasonable royalty, plus whatever special damages can be shown. Thus, the distinction, hitherto important, between damages collectible at law and an accounting in equity largely disappears.

[9] There are various statutory provisions for review of a Patent Office rejection which are not important to the present discussion.

[10] REV. STAT. §4920 (1875), as amended, 35 U. S. C. §69 (1940).

[11] Most patents never get into litigation, either because they are not infringed, because the patentee does not attempt to enforce them against infringers, or because settlements are reached with users and would-be users by the grant of licenses or other means. In some instances even where patents are in litigation determination on the merits is foreclosed, *e.g.*, where licensees or assignors of patents attempt to challenge their validity. Kinsman v. Parkhurst, 18 How. 289 (U. S. 1855). This doctrine of estoppel has, however, been subject to considerable qualification in recent years. Sola Electric Co. v. Jefferson Elec. Co., 317 U. S. 173 (1942); Scott Paper Co. v. Marcalus Mfg. Co., 326 U. S. 249 (1945);

So much for our patent laws as they appear on the books. Turning again to the public interest aspect, just what does our patent system accomplish? A number of considerations may be urged in its support:

1. By holding out the reward of a seventeen-year exclusive right, it induces research and stimulates ingenuity, which result in the creation of new devices and the development of many ideas which would not have been created or developed but for this hope of reward.

2. By offering a seventeen-year exclusive right, it induces individuals who have made important discoveries to disclose them to the public, thus enabling the public, after seventeen more or less lean years, to make free use of something of which it might never have learned had not the inventor been induced to disclose his secret—the contract theory.

3. It represents a bounty or a bonus paid by a grateful public, *i.e.*, government, for a valuable contribution—the reward theory. This is an interesting and certainly a commendable approach, but one may legitimately question whether it is a factor that carries much weight. Unfortunately, society as represented by government tends to be somewhat niggardly in granting, after the fact, substantial rewards to its benefactors.[12]

4. It gives to an inventor, as a matter of justice, sound public policy, and, perhaps, natural right, the fruits of his own labor and protects from piracy that which he has accomplished.[13] As one writer has expressed it:

> . . . all the citizen's fundamental personal rights represent simply the State's promise to exclude other persons from the thing which is the object of the right, *i. e.*, a grant of a monopoly of use of the thing; . . . the rights of industrial and intellectual property (patent rights and trade-marks) are herein no different from the other rights; . . .
>
> The social merit at the basis of this right is the general conviction that such invention deserves firm encouragement. But, once the right is so recognized, it is no different in

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MacGregor v. Westinghouse Elec. & Mfg. Co., 329 U. S. 402 (1947); Edw. Katzinger Co. v. Chicago Metallic Mfg. Co., 329 U. S. 394 (1947); *cf.* United States v. U. S. Gypsum Co., 53 F. Supp. 889 (D.D.C. 1943).

[12] Individuals are more likely to give vent to the instinct of gratitude than governments, which, after all, are dealing with the belongings of the people, not their own, and are in a less favorable position to indulge in generosity. Likewise democratic governments, accountable to the people, may find such acts more difficult than authoritarian rulers who can indulge their favorites at their subjects' expense with a certain amount of impunity, for the time being at least. Even the soldier's bonus, apart from its vote-getting aspect, may result only partly from a desire to reward those who have made sacrifices—and partly from a feeling that the grant of a bonus at this time will be helpful in inducing support for future wars because of the future soldier's fair assumption that he will also be dealt with generously. *Cf.* the "Veterans of Future Wars" of a few years back.

[13] FOX, *op. cit. supra*, note 3, at 14; STEPHEN P. LADAS, THE INTERNATIONAL PROTECTION OF INDUSTRIAL PROPERTY, 4-6 (1930); United States v. Parker-Rust-Proof Co., 61 F. Supp. 805, 812 (E. D. Mich. 1945). There is little to suggest that the framers of the Constitution viewed patent rights as a natural right, however, notwithstanding the constitutional provision is framed in terms of exclusive rights. In the first place, the constitutional provision is merely permissive; it does not *require* protection for inventions. Secondly, the concept of an inherent right in industrial property has had little currency until fairly recently. In earlier days the more commonly accepted view was that monopolies, for invention or otherwise, impinged upon certain natural rights. 1 ROBINSON ON PATENTS 37-52 (1890); *cf.* Kahn, *Fundamental Deficiencies of the American Patent Law*, 30 AM. ECON. REV. 475, at 476.

nature from the fundamental rights of property, personal security, and domestic relations, . . .[14]

5. It induces the importation from foreign lands of techniques and ideas which would otherwise not become available. This justification, highly important in the early days when transportation was difficult, when foreigners were looked upon with even more suspicion than they are today, and when the general communication of ideas was almost impossible, is now a negligible factor, although certain vestiges of the concept still remain in some patent systems.[15]

6. The grant of an exclusive right, by depriving others of the right to use the invention, stimulates them to added ingenuity and research in an attempt to "invent around" it, thus creating new inventions which cumulatively add substantially to our total technological knowledge.[16] Or, what to some extent amounts to the same thing, it may induce one to undertake research for fear a competitor may do it if he does not and thus "block" him off.[17]

7. The development and disclosure of an invention starts a chain reaction. Others learn of the idea through the patent disclosure and are sparked to additional ideas. Thus, a single invention may eventually result in numerous additional inventions.

8. Finally, and of major importance, the patent system, by providing seventeen years' exclusive rights, encourages the exploitation and commercial development of the invention. An invention is necessarily new and untried. If it is a product, the public may not take to it. If it is a process or machine, it may not work in practice, at least without substantial and expensive modification, however practical it appeared on paper and however successful the experimental and laboratory tests. In short, it is often a long step from creation of the invention itself to actual availability of its benefits to the public, a step that may be attended by considerable investment, additional experimentation, and real possibilities of failure. Speculative efforts call for greater rewards than sure-fire activities. If the developer of an invention must bear the costs of failure alone, but must share its success with others who will adopt the invention once it is proven, incentive to undertake its development may be seriously retarded. Beyond this, in situations in which the entrepreneur must depend upon outside capital rather than his own, denial of a monopoly profit may make it impossible for him to undertake development of the invention, or even to make the invention itself, or to assume the expense of obtaining a patent if he does make it. A further and related benefit which has been suggested is that the organization which possesses a strong patent position, and hence a profitable one, can afford to plow back its profits into additional research and in fact does so, whereas the organization subject to vigorous competition has little in the way of profits to expend on such activities.[18]

[14] Wigmore, *The Patent "Monopoly,"* 25 J. PAT. OFF. SOC'Y 687, at 688, 689 (1943).

[15] Fox, *op. cit. supra,* note 3, at 45.

[16] See testimony of William H. Davis in *Hearings before the Special Committee on Atomic Energy on S. 1717,* Pt. 1, 79th Cong., 2d Sess. 61-62 (1946).

[17] FRANK J. KOTTKE, ELECTRICAL TECHNOLOGY AND THE PUBLIC INTEREST 45 (1944).

[18] *Id.* at 124.

The justifications enumerated make a strong case indeed for a patent system such as we have, and give support to the claims of those who insist that our patent system, more than any other single factor, is responsible for the amazing commercial and industrial development that has characterized our economic society. But this is only one side of the coin. It is usually true that one does not obtain something without giving something up. What does the patent system deprive us of?

1. By granting a seventeen-year exclusive right to the fortunate winner of the race, it deprives one who may have independently arrived at the same discovery of the right, sometimes described as a natural right,[19] to use it himself—a deprivation which is aggravated by the fact that under our law, within limits, the first inventor gets the patent, even though a subsequent inventor may have made the real public contribution in the sense of bringing it more rapidly to completion and making it available for general use.

2. It deprives others of the right to take advantage of and use for their own benefit the contributions and ideas of others. Although this concept conflicts with the concept of protecting the inventor's right to the fruits of his own labor,[20] it is one which is thoroughly entrenched in our social system. As Judge Learned Hand has said,

> One may bestow much labor and ingenuity which inures only to the public benefit; "ideas," for instance, though upon them all civilization is built, may never be "owned."[21]

The plain fact is that all of us make greater or lesser contributions which others may use to their own benefit, just as we ourselves constantly draw upon the achievements and thoughts of others and turn them to our own advantage. It is fortunate that this is so, for it is difficult to conceive a workable social system in which every individual could hold to himself his every achievement or levy a toll upon others to the extent that they obtain benefits therefrom. While it may be that disclosed inventions should receive a protection which is denied to innumerable other ideas and thoughts, a sound determination of this issue is more likely to be found by resort to other considerations, not by reliance upon a concept of broad protection of ideas.

3. The grant of exclusive rights may have the effect of discouraging rather than encouraging research and inventive activity, since those who are excluded, at least those who invent for profit and their own advantage—and the patent system is clearly designed to attract persons of that temperament—may be indisposed to labor extensively in fields in which they may be unable to operate for a number of years.[22]

[19] 1 ROBINSON ON PATENTS 45-47 (1890). [20] See note 13, *supra*.

[21] R. C. A. Mfg. Co. v. Whiteman, 114 F. 2d 86, 90 (C. C. A. 2d 1940).

[22] This objection may be partially ameliorated by the possibility of the outsider's "inventing around" the patented invention. Unfortunately, this cannot always be done. Even so, research and invention would not suffer if one could be assured that the patentee would dig vigorously in his exclusive field, to use Mr. Davis' analogy (note 16, *supra*), even though others were excluded. But it sometimes happens that the domain assigned to the patentee for his exclusive digging is larger than he is able or willing to till effectively, despite which he keeps others out. A flourishing crop of inventions will not result under those circumstances.

4. Perhaps the most serious charge directed against our patent system is that it injects into the sound, well-balanced competitive economy to which we are dedicated[23] an anomalous monopoly situation which carries with it all the undesirable effects normally attributable to an unregulated monopoly.[24]

It may be granted that we do have in our economic structure a number of institutions, *e.g.*, public utilities, which supposedly operate effectively only within a monopolistic framework. We also have activities which supposedly can operate effectively only under government ownership—the public roads, schools, etc. We have situations in which groups are permitted to band together on a quasi-monopoly basis to achieve sufficient strength to meet at the bargaining table those with whom they must bargain—labor unions, cooperative associations, etc. Indeed, as Professor Wigmore and others have pointed out, the ownership of property is itself a monopoly.[25]

The monopolistic power to exclude others from the use of a patented invention does not, however, seem to fall within any of these categories. It usually operates in competitive surroundings and to that extent is likely to have a disrupting and upsetting influence. Furthermore, it is a monopoly which is permitted to operate free of Government control after it is granted.[26]

The foregoing catalogue of the advantages and disadvantages which flow from our patent system makes one thing abundantly clear. The system is neither black nor white. It brings to our economy many and substantial benefits. It also brings serious detriments, disrupting influences, and upsetting features which we should like to eliminate. A proper evaluation of the system cannot ignore the fact that it has these two sides, any more than an employer-employee relationship can be properly evaluated if one looks only to the work the employee performs or only to the wages one must pay him on Saturday night.

The real question is, do we get enough in benefits, *i.e.*, advancement in technology, development and disclosure of inventions, and exploitation of inventions which would otherwise lie dormant, to make the seventeen-year sacrifice worth while? In short, the patent system must be evaluated in terms of the price we pay for what we get. This suggests three fundamental questions:

1. Do we get from the inventor what we pay for? Alternatively, do we sometimes renege on our promise to reward him after he has performed his part of the bargain?

2. Assuming we pay what the patent statutes say we do, *i.e.*, a seventeen-year

[23] Note 6, *supra.*

[24] See Kahn, *loc. cit. supra,* note 13, at 476:

"The patent law is a method, a means to a socially desired end. To encourage invention, the State grants to the inventor a monopoly right to manufacture, use, and sell his creation. A strange choice of means, it would seem, for a competitive, *laissez-faire* society. . . ."

[25] Wigmore, *loc. cit. supra,* note 14, at 687.

[26] The early history of monopoly in England shows that whatever public benefit accrued therefrom largely tended to disappear when the monopolies came to be solely the instruments for private benefit and the government which granted them abdicated its responsibility for controlling their use and preventing their abuse. Fox, *op. cit. supra,* note 2, at 92-93, 125, 136, 185.

exclusive right, are we paying too much? Are we paying too little? In other words, could we get substantially the same results for a lower price?[27] Alternatively, would we get considerably more if we paid more?

3. Is the price we pay limited in fact to a seventeen-year exclusive right or do we pay more than that? Or less than that?[28]

II

THE CONTRACT: IS THERE SUBSTANTIAL PERFORMANCE ON BOTH SIDES?

It will be recalled that the deal between the Government and the patentee is simply this: The Government agrees to give a seventeen-year right to exclude others in exchange for the inventor's public disclosure of his invention. The inventor fails to perform his part (1) if he has not made a disclosure of his invention adequate to enable others to practice it when his exclusive rights expire, or (2) if the device upon which he gets a patent is not in fact a patentable invention. The Government fails to perform its part if it induces such disclosure and thereafter refuses to lend its support to the enforcement of the exclusive right.

Looking first to the question of adequate disclosure, it is apparent that many issued patents do not adequately explain the invention, at least to the extent of enabling others to use it effectively. The numerous court decisions holding patents invalid for this reason bear witness to this.[29] The importance attached to the furnishing of "know-how" in licensing agreements testifies to it. Situations have occasionally arisen which drive home the inadequacy of patent disclosures. Thus, when the Government took over the German aniline dye patents in the first World War it found that it was impossible to exploit the processes successfully without conducting extensive additional research.[30]

In fairness to the inventor, however, it may be suggested that in many instances the situation is more irritating than serious. The patent law, after all, does not require the disclosure of every possible detail concerning the invention and its use. It merely requires a disclosure sufficient "to enable any person skilled in the art . . . to make, construct, compound, and use the same."[31] If this standard is met, it cannot be said that the patentee has not fulfilled his obligation or made a contribution. By hypothesis, the invention has been publicly disclosed and can be put to use if one is willing to make an effort. All that can be said against the patentee is that he has contributed less than he could have contributed.

[27] It would seem a fair assumption that in the patent field no social problem arises, as it does in the field of labor, for instance, whereby it becomes necessary in the public interest to guarantee a certain minimum return for one's services, even though those services could be obtained for less if the forces of competition and bargaining were given free play.

[28] The ensuing discussion does not answer these questions. It merely raises them and elaborates upon them. Nevertheless it may be useful to arrive at an understanding of what the issues are.

[29] 50 FED. DIGEST (Patents) §118 (1941).

[30] United States v. Chemical Foundation, 294 Fed. 300, 318-319 (D. C. Del. 1924); 5 F. 2d 191, 212 (C. C. A. 3d 1925).

[31] REV. STAT. §4888 (1875), as amended, 35 U. S. C. §33 (1940).

The more serious problem results from the granting of patents on developments which purport to be inventions but which do not, in fact, meet the tests of invention as laid down by the courts. Whether or not the courts have themselves erred in their definition of "invention" and their administration of the tests of invention they have laid down, is a question which will be taken up later. For the purpose of the immediate discussion, assume that under our patent laws "invention" is a prerequisite to a valid patent and that the tests of invention adopted by the courts are correct and correctly applied. From the legalistic standpoint, the assumption is a proper one. The courts have the last say as to whether or not a patent should have issued, and if, by their tests, a patent is granted which should not have been granted, the patentee, to the extent that he is successful in enforcing his patent, gets paid without performing his part of the contract, *i.e.*, disclosure of an invention.[32] From the broader standpoint of the public interest, the picture is a little different. Here, the correctness of the "invention" test and its application cannot be ignored. In other words, if the courts have set their sights too high and have invalidated patents that should have been held valid, one cannot properly accuse the patentee of not performing his part of the bargain. Conversely, if they have upheld patents that should have been invalidated, the problem being discussed is aggravated.

If we accept as correct the standards applied by the courts, the number of spurious patents issued by the Patent Office has been so large as to arouse much discussion and serious concern.[33] The difficulty arises mainly as a result of the difference between the standards of invention applied by the Patent Office and those applied by the courts.[34] Even if the standards were the same, the fact that Patent Office proceedings are *ex parte* in nature makes it unlikely that the full facts and implications of the prior art, on the basis of which the question of invention must be determined, will be brought out.[35] In the courts, on the other hand, an infringer plays a vigorous role as an opposition party.

[32] I intend no suggestion of improper conduct in one's inducing the Patent Office to issue a patent which should not have issued for want of invention. What constitutes an invention is a notoriously uncertain question and an applicant is entitled to present his case in the best possible light, provided he acts in good faith and does not mislead the Patent Office or conceal pertinent facts. It is up to the Patent Office to find non-invention if there is none.

[33] Evans, *Disposition of Patent Cases by the Courts*, 24 J. PAT. OFF. SOC'Y 19 (1942); Brown, *Developments in the Patent Law as Affected by Adjudications*, 22 J. PAT. OFF. SOC'Y 587 (1940); Fox, *op. cit. supra*, note 3, at 265-266.

[34] Compare the following expressions of the Supreme Court and the Court of Customs and Patent Appeals, respectively:

". . . the new device, however useful it may be, must reveal the flash of creative genius, not merely the skill of the calling. It it fails, it has not established its right to a private grant on the public domain." Cuno Engineering Corp. v. Automatic Devices Corp., 314 U. S. 84, at 91 (1941).

". . . until Congress shall otherwise legislate, or the Supreme Court shall otherwise specifically hold, this court will continue to hold that if a process or thing constitutes patentable subject matter, is new and useful, and the process performed or thing produced would not be obvious to one skilled in the art, invention should be presumed and a patent may properly issue therefor." In re Shortell, 142 F. 2d 292, 296 (C. C. P. A. 1944).

[35] Nor can one overlook the possible impact of the Patent Office review procedure. Considering the numerous opportunities for appeal afforded a rejected applicant, there may sometimes be a temptation to allow the patent in a doubtful case and have done with it.

Theoretically, the existence of a horde of spurious patents presents no serious problem. The error can be corrected by an infringer's going into court and demonstrating the invalidity of the patent, whereupon the court will declare it unenforceable. Unfortunately, the problem is not that simple. Patent litigation is notoriously expensive, complicated, cumbersome, and slow. It is little satisfaction to an "infringer" of an invalid patent to prove that he had a right to use the "invention" if he has been ruined, or almost ruined, in the process of proving it. In these circumstances, a patent may constitute a powerful coercive weapon for a long period before the courts get around to taking the weapon away.

The combination of these two deficiencies in our patent system, *i.e.*, the existence of a large number of spurious patents and the practical difficulty of demonstrating their spuriousness, creates a situation that we cannot be complacent about. If issued patents were on the whole valid, cumbersome court proceedings for determing invalidity would not be too serious. Conversely, if court proceedings were simple, expeditious, and inexpensive, error in the issuance of patents could easily be corrected. But the situation, as it now stands, is comparable to that of an oppressed people who can obtain no redress for their injuries.

It is not within the scope of this paper to discuss in detail the possible remedies for this situation. Measures which have been suggested for reducing the number of invalid patents issued include the following:

1. More complete access to, and better organization of, scientific treatises and technological information, from which can be obtained a better understanding of the relation between the alleged invention and the art to which it relates.[36]

2. Opposition proceedings whereby others could urge that the patent be withheld.[37] Whether such opposition proceedings were provided for prior to or subsequent to the issuance of a patent would not seem very important. What is more important is that such procedure implies a departure from the present practice of keeping applications secret until a patent issues—an implication which is probably a little disturbing to those who adhere to the "consideration for disclosure" theory of patents.

3. Proceedings brought by the Government to cancel for invalidity.[38] There is probably little basic difference between this and the opposition proposal, except that the Government instead of a private person assumes the effort and expense of the proceeding—fair enough, perhaps, since the Government was the original sinner in issuing the patent.

4. One device often suggested is simply to eliminate invention as a test of valid-

[36] REPORT OF THE SCIENCE ADVISORY BOARD (1935), in *Hearings before the TNEC*, Pt. 3, 76th Cong., 1st Sess. 1139, 1145 (1939); *Hearings before the Committee on Patents on H. R. 3605*, 76th Cong., 1st Sess. (1939); *Hearings before the Committee on Patents on H. R. 6721*, 76th Cong., 1st Sess. (1939).

[37] REPORT OF THE SCIENCE ADVISORY BOARD, cited *supra*, note 36, at 1141; REPORT OF THE NATIONAL PATENT PLANNING COMMISSION 11-12 (1943); H. R. 2660, 80th Cong., 1st Sess. (1947).

[38] Note, *Patent Validity in Anti-Trust Suits*, 42 COL. L. REV. 1182 (1942); *cf.* S. 72, Tit. IV, 80th Cong., 1st Sess. (1947).

ity.[39] This is a simple and certainly effective way of disposing of the problem. But unless it can be justified on public interest grounds, and I have difficulty in seeing how it can be, it is tantamount to preventing crime by repealing the criminal laws.

On the litigation side, the following measures, among others, have been suggested:

1. Creation of a single court of patent appeals,[40] a device which, whatever its merits in other respects, would probably not go very far toward solving our problem since the main difficulties under discussion here arise at the trial-court level.

2. Referral of validity questions back to the Patent Office for an advisory opinion.[41]

3. Appointment of scientific advisers to aid the judges.[42] Whatever contributions advisory experts, whether in the Patent Office or specially appointed, may make in obtaining *better* decisions, it is doubtful whether they would contribute much to expedition and economy in litigation.

It is significant that all three of the above proposals have for their premise that the problems attending patent litigation, especially on the issue of invention, are so complicated, technical, and abstruse that they lie beyond the ken of the ordinary judge engaged in the routine discharge of his duties. In other fields than patents we have met this type of situation, once it became sufficiently acute, by setting up specialized tribunals—tax courts, labor boards, customs courts, workmen's compensation tribunals, Federal Trade Commissions, Interstate Commerce Commissions and so on—tribunals which are still subject to some court control but which take care of a large proportion of the controversies which had previously fallen to the courts. Certainly, the possibilities of a similar approach to the patent question should be investigated. The establishment of such tribunals is, of course, no panacea. Litigation before them can be just as protracted, just as complex, just as expensive as litigation before the courts. Their decisions can be just as erroneous as court decisions. Conceding all this, it is probably a fair deduction that such tribunals have, by and large, helped rather than hindered in the solution of the specialized problems diverted to them.

Thus far, the discussion has been directed to the question whether the public gets what it pays for. What about the patentee?

On the validity issue, he may be injured in two respects: (1) If a court erroneously holds invalid a patent which it should have held valid, he loses the seventeen-year exclusive right which the Congress promised him when it enacted the patent law; (2) in accepting a patent he has given up the right, such at it is, to keep his discovery secret; if the patent is later held invalid he will have disclosed his secret without receiving anything in return.

[39] Fox, *op. cit. supra,* note 3, at 285-308.

[40] REPORT OF THE SCIENCE ADVISORY BOARD, cited *supra,* note 36, at 1142; REPORT OF THE NATIONAL PATENT PLANNING COMMISSION 16-17 (1943).

[41] REPORT OF THE NATIONAL PATENT PLANNING COMMISSION 15-16 (1943).

[42] REPORT OF THE SCIENCE ADVISORY BOARD, *supra,* note 36, at 1142-1143; concurring opinion of Judge Frank in Picard v. United Aircraft Corp., 128 F. 2d 632, 639-640, 641 (C. C. A. 2d 1942).

I question whether either of these injuries is very serious. As for the first, there is no indication that the courts err any more frequently in applying the tests of invention than they do in applying other legal tests, or that such errors as do occur are more often prejudicial to the patentee than favorable to him.[43] As for the second, the patentee knew when he accepted the patent that he was runing the risk of its being declared invalid. Furthermore, by hypothesis, he has not lost very much since the very ground upon which it is held invalid is that others would make the "invention" if he did not.[44]

The litigation problem is more serious. The complexities and expense of litigation may be as disadvantageous to the patentee as to the alleged infringer, since a powerful infringing corporation may make it virtually impossible for a patentee without substantial resources to establish the validity and infringement of his patent. Some of our great inventors, who certainly were not less able than the average individual inventor to defend their rights, have testified in vigorous terms to the effect upon inventors of our legal machinery. Thus Thomas Edison:

> The long delays and enormous costs incident to the procedure of the courts have been seized upon by capitalists to enable them to acquire inventions for nominal sums that are entirely inadequate to encourage really valuable inventions. The inventor is now a dependent, a hired person to the corporation. The administration of the law is the cause.[45]

And Dr. Baekeland:

> Woe, indeed, to the poor inventor who tries to enforce his rights against wealthy infringers, aided by skillful lawyers; his well-engraved United States patent parchment may then become his certificate of entrance to the poorhouse or to the lunatic asylum. All this tends to discourage invention by independent individuals and paralyzes the stimulation of invention our Constitution intended to promote by the patent law.[46]

There is little to indicate that there has been much change in the situation since these statements were made thirty-five years ago. A recent commentary has the same familiar ring:

> . . . infringement litigation, lasting many years and costing many thousands of dollars, is necessary in order to test the validity of the disputed patent and to determine whether infringement has occurred. If both parties wish to, and can afford to, they may go through with the litigation until it ends either in a judicial decision or in exhaustion or bankruptcy of one of the parties. If the parties are unable or unwilling to go on,

[43] It is essential to distinguish here between errors in the *application* of the invention tests and errors in the tests themselves. The validity of the tests of invention is a facet of the issue whether we pay too much or too little for inventions. Knowing that the standard of invention is high and that his patent is only prima facie, not conclusively, valid, the patentee cannot complain if it fails to meet that standard and is adjudicated invalid; he can complain only if it does meet the standard and a court erroneously holds that it does not.

[44] If, as has sometimes been suggested, all patent applications were made public instead of being retained in secrecy unless or until a patent issues, the patentee whose patent has been declared invalid would be in no worse position than if it had been denied at the outset.

[45] *Hearings before Committee on Patents on H. R. 23417* (Oldfield bill to revise and codify the Patent statutes), 62d Cong., 2d Sess. Pt. 23, 32 (1912).

[46] *Id.*, Pt. 4, at 34.

they will be forced to settle, or to forget the whole matter, thus rendering questions of justice quite irrelevant and making questions of relative strength and bargaining power the major determinants of the outcome. The patentee needs money to protect his rights —rights which, after years of litigation, he may find to be non-existent. No wonder he so often gives up the patent for little or nothing to others who can afford the luxury of owning it and enforcing it in the courts. . . .[47]

In short, the present situation plays into the hands of the litigant with the strongest financial backing and the litigant who has an interest in maintaining the status quo, whether he be the one who is attempting to enforce the patent or the alleged infringer. This particular defect operates indiscriminately upon small patentee and small infringer alike. It may be true, as pointed out before, that its adverse effect on the infringer is more serious than upon the patentee because of the many spurious patents outstanding. But this is small comfort to the patentee who does own a valid patent which should give him enforceable rights but which turns out to be, as Dr. Baekeland says, "his certificate of entrance to the poorhouse or to the lunatic asylum."

III

THE REWARD: DO WE PAY THE RIGHT PRICE FOR INVENTION?

For the purpose of inquiring whether we pay too much or too little for invention, I will assume we pay what the patent law says we pay: the grant of a seventeen-year right to exclude others from practicing it. The issue is to be tested by asking several questions: Is it necessary to give exclusive rights? Might we achieve adequate invention and exploitation by limiting the inventor to collecting a royalty for the use of his invention, at least for some part of the period or with respect to certain uses? Is a seventeen-year patent needed to induce adequate research and exploitation? Should the period be even longer? Or might it be made shorter and still accomplish our objective? Could the scope of patent protection, represented by the claims of the patent, be narrowed, thus reducing the area in which the inventor has exclusive rights? Should its scope be enlarged? Finally, might the standard of invention be made even higher than it now is, thereby limiting the patent grants to only the most outstanding "inventions"? Or should the standard be lowered?

As a general proposition, the more we offer to pay for invention the more invention we are likely to get.[48] If this were the sole issue, the answer would be simple: give more rights and get more invention. But the answer is not that simple. As in other fields, there is a point of diminishing returns, when the extra contributions we get are not worth the price we pay. Thus, increased efforts in utilitarian research, the type brought forth by the patent system, may result in lessened activity in other fields equally or more important from the broad social standpoint. Even

[47] Kahn, *loc. cit. supra,* note 13, at 484 (1940); see also, Picard v. United Aircraft Corp., *supra,* note 42, at 641-642.

[48] This is subject to some qualification when inventions culminate in patents. The issuance of a patent may discourage rather than encourage research by others if it blocks off a field of endeavor. Similarly, it may block, and thereby discourage or prevent, the exploitation of inventions.

within the field of technology itself, the stimulus of our patent system may divert individuals from fundamental and basic research into petty gadgeteering. These questions aside, the question still remains whether, considering modern business, industrial, and commercial circumstances, it might not be possible to reduce the reward substantially without reducing to any great extent the incentive to invent and exploit.

Turning first to the question of the exclusiveness of the grant and viewing it from the standpoint of the stimulus to invent: Notwithstanding the frequent assertion that exclusiveness is the very heart of the patent system, it is doubtful whether this feature is a *sine qua non* of the stimulus to invent. The evidence suggests the contrary. Much research is carried on by organizations which do not themselves exploit the patents they obtain but license them on a royalty basis instead. Much research is carried on, especially in educational institutions, without the expectation of any return at all for the inventive effort other than the credit and acknowledgment that is extended to successful effort. The inventor himself—and invention in the last analysis is the product of personal effort—is rarely compensated in terms of exclusive rights; rather he receives a salary or bonus for his contribution, with the execlusive rights going to his employer.

Outside the patent field, there is ample evidence of a willingness to undertake given activities, provided a fee is forthcoming from those who benefit. The same type of reward should be adequate to stimulate invention. Most countries have compulsory licensing laws, at least of a limited nature, and I am not aware that their existence has substantially discouraged invention. Within our own system compulsory licensing operates to a limited degree with respect to production or use by or for the Government.[49]

Direct stimulus of invention, however, is not the whole answer. Indirectly, exclusiveness may encourage research by compelling individuals to "invent around" patents. Whether this advantage is sufficiently important to offset the substantial disadvantages that arise from denying others the opportunity to use an invention, even though they are willing to pay a toll for the privilege of doing so, is far from certain.

The case for exclusiveness on the ground that an exclusive period is necessary to attract capital and induce exploitation of the invention is on firmer ground. Some enterprises based upon new inventions may be quite speculative and uncertain, involving the production of goods which the public may reject for lack of utility or for other reasons. Conceding that this is sometimes true, it hardly affords adequate justification for the grant of exclusiveness in those situations—perhaps the more typical ones—in which it is apparent that the article to be produced will find ready acceptance with the public, or where little initial investment is required and hence the need for holding out additional reward is slight.

It is also urged that exclusiveness is necessary in order to enable the small be-

[49] 36 STAT. 851(1910), as amended, 35 U. S. C. §68 (1940).

ginner to protect himself against well-established competitors until his infant business reaches a point where it can stand on its own feet. No doubt this is sometimes true. There is only one hitch. Modern research has become increasingly a big-business activity. More and more patents come to rest in the hands of large companies. One may at least inquire whether the du Ponts, the General Electrics and the R.C.A.'s need patent protection against the small, scattered, individual enterprises, however much the reverse may be true. The "protection" argument is further weakened by the fact already mentioned that a patent may be a powerful weapon if one can spend the money necessary to enforce it and a relatively ineffectual weapon if that money is lacking.[50]

Issues similar or comparable to those just discussed come up in connection with certain other features of patent protection. Thus, one can evaluate the seventeen-year period of protection only in the light of whether a longer period would give a fillip to the inventor which would bring forth enough additional research, or whether it would induce sufficient additional exploitation which would not be forthcoming under a mere seventeen-year monopoly, to justify depriving the public of the free use of the invention for the additional period. Conversely, could the period be cut down, with consequent advantage to our competitive society, without putting much of a damper on either the stimulus to invent or the incentive to exploit? I do not answer the question. I merely pose it. There appears to be little suggestion, however, that the present period is too short. The exceptions are largely limited to individual cases in which Congressional extension of specific patents is sought (almost always unsuccessfully),[51] proposals for the extension of certain classes of patents because circumstances, usually war, have interfered with their exploitation,[52] and the uncritical suggestions of some commentators that patents should receive protection for periods comparable to those given to copyrights and trade-marks. On the other side, it may be pointed out that in this fast-moving world seventeen years is a long time. It has been suggested that in today's economy the seventeen-year grant is both unnecessary and undesirable.[53]

[50] The tendency to argue broad principles (of which this article is an example), rather than look to actual facts, finds illustration in this connection. Despite the violent controversy as to whether the patent system protects or injures small business, no one, as far as I know, has taken the trouble to examine the patent cases to ascertain the extent to which big companies have been successful in patent litigation as compared with small companies. Such a study would not, of course, provide a complete picture, since many patent controversies are settled without resort to litigation—usually, it has been suggested, to the relative advantage of the big company. KOTTKE, *op. cit. supra*, note 17, at 134-135.

[51] But see Priv. L. No. 554, 58 STAT. 1095 (1944), extending the Aronson patent.

[52] Act of May 31, 1928, 45 STAT. 1012-1014 (1928), 35 U. S. C. §§40(a)-40(d) (1940); see H. R. 65, H. R. 124, H. R. 1107, and H. R. 1984, 80th Cong., 1st Sess. (1947).

[53] "Technology moves now with a speed once undreamed of—its swift march dictates a shortening of the life of a patent. Industries move at very different tempos—unlikeness suggests life spans accommodated to their distinctive requirements. The patent system itself is not designed to give protection at all points where creation touches the industrial arts; if it is to fit neatly, its life span needs to be measured to a variable necessity. A news agency requires protection for its coverage for 4 hours. The life of a design in a dress is a season; its protection for a few weeks is as much as the designer wants. In radio reception technique moves at a brisk pace; in automobiles, innovation now comes far more rarely; in the sewing machine an industrial art is almost stagnant. The period of privilege

The extent of patent protection is also susceptible of expansion or contraction by enlarging or narrowing the scope of the claims allowed. The question, again, is whether enlargement is desirable in the public interest to encourage research and exploitation or whether the scope of protection could be made narrower than it now is without unduly retarding the progress of science and useful arts. Theoretically, one receives protection coextensive with the scope of one's invention, and there would seem little room for flexibility on this score. As a practical matter, however, there is room for considerable discretion both in formulating allowable claims and in interpreting them. As will be seen later, the courts in interpreting claims and passing upon their validity have injected considerable flexibility into an otherwise quite inflexible system.

The question whether the standards of invention should be higher or lower than they now are involves a number of special considerations distinct from those that arise in the more obvious matters just discussed. Here, as in the previous discussion, the issue is whether the public interest calls for a higher test of invention, resulting in fewer patent monopolies but perhaps less incentive to invent and exploit, or a lower test, resulting in more patents and more incentive. Probably no phase of the patent system has been the subject of more controversy, and more broken lances, than "invention."

It would help in evaluating this point if we knew what the present tests are. We know what seventeen years means. We do not know what "invention" means. Numerous and varied tests have been conjured with by the courts and the Patent Office. Rules of thumb have been applied and, almost as frequently, ignored, such as the rules that mere addition or subtraction of elements, mere aggregation as distinguished from combination, changes in form, reversal of parts, substitution of elements, etc., do not constitute invention.[54] Other affirmative tests, such as satisfaction of a long-felt want, delay in achieving success despite long efforts, contribution to society, extent of commercial success, extent of research necessary, and so on, have been applied or suggested as tests to determine whether a given result is relatively difficult to achieve and/or sufficiently beyond the ken and ingenuity of the average man to warrant the title of "invention."[55] In even more generalized terms,

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should be long enough to keep invention on the march and short enough to prevent an interest from becoming vested. Upon the current stage, a span of 17 years—fixed when technology moved at a far slower tempo—may be quite excessive. It may well put in jeopardy the very institution of free enterprise to which it was set down as spur and exception. If its prolonged life allows its owner to dig in securely and to rest upon his rights, it fails the office it was intended to serve." WALTON H. HAMILTON, PATENTS AND FREE ENTERPRISE 157 (TNEC Monograph 31, 1941).

[54] Knoblock, *Patentable Invention*, 6 NOTRE DAME LAW. 225 (1931); Plaisted, *What Is Invention?* 14 J. PAT. OFF. SOC'Y 328 (1932).

[55] The following are only a few of the many discussions of the subject: Stringham, *Invention*, 15 J. PAT. OFF. SOC'Y 511 (1933); Dietrich, *A Definition of Invention*, 13 *id.* 595 (1931); Case, *A Plea for Equitable Consideration When Trade-Novelty is Established*, 15 *id.* 437 (1933); Hoar, *Definition of Invention*, 14 *id.* 25 (1932); Seitz, *Invention*, 1 *id.* 380 (1919); Mann, *Testing for Invention*, 15 *id.* 6 (1933); Root, *Lack of Invention as a Ground for Rejection*, 21 *id.* 64 (1939); Dawson, *Research as a Criterion of Invention*, 29 *id.* 567 (1947); Allyn, *Patentable Yardsticks*, 25 *id.* 791 (1943); Richard, *Standards of Invention in the Patent Office as Affected by Recent Decisions*, 27 *id.* 24 (1945); Richey,

so indefinite as to afford little help as a workable test, invention has been described as "something more than the mere application of mechanical skill," a "flash of genius,"[56] "that impalpable something,"[57] etc. When one is all through, there is little to do but throw up one's hands in despair and say that invention, like the Constitution, is what the judges say it is.

The inherent uncertainty in the existing tests of invention has been a crucial problem in the patent system, from the standpoint of both the patentee and the public. The National Patent Planning Commission urged as one of the major reforms the formulation of an objective test of invention.[58] Legislation to establish such a test has been introduced in Congress.[59]

Unfortunately, there is serious question whether the problem can be solved by the mechanical application of any sort of yardstick. The basic issue facing the courts and the Patent Office, however, is this: Can it be said that the specific "invention" before the tribunal is sufficiently remote from the grasp and understanding of most people that it is reasonable to suppose that it would not have become available to the public but for the increased efforts which the patent system induces, for such a long period of time that it is worth while, from a public standpoint, to give to the inventor the extensive rights which he receives under the patent laws?[60]

Obviously, the criterion just suggested is no more susceptible of mechanical appli-

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Some Objective Tests, 27 *id.* 187 (1945). One of the more illuminating discussions of the real issue, although it offers no solution, is found in EMERSON STRINGHAM, OUTLINE OF PATENT LAW 222-253 (1937).

[56] Densmore v. Scofield, 102 U. S. 375, 378 (1880); Cuno Engineering Corp. v. Automatic Devices Corp., 314 U. S. 84, 91 (1941). One federal judge has discovered that, by sticking one's tongue in one's cheek, the flash of genius can be made to work both ways—which should simplify the problem considerably:

"I remember once, in the trial of a patent case, where it was contended with great vigor on the one side that the patent evidenced invention of the highest order, and with equal vigor on the other that the device in question was merely a mechanical advance, I announced, almost without any sense of incongruity, that I would take the case under advisement, and after 'having well and exactly seen and surveyed, overlooked, reviewed, read and read over again' etc., all of the briefs, authorities and the record, would wait awhile before deciding to give my mind a chance to hunch it out, for if there was the flash of invention in the device my mind would give back an answering flash; while if there were none, my mind would, in a dully cogitative way, find mechanical advance." Hutcheson, *The Judgment Intuitive: the Function of the "Hunch" in Judicial Decision*, 14 CORN. L. Q. 274, 280 (1929).

[57] McClain v. Ortmayer, 141 U. S. 419, 427 (1891).

[58] REPORT OF THE NATIONAL PATENT PLANNING COMMISSION 14-15 (1943).

[59] H. R. 3694, 79th Cong., 1st Sess. (1945).

[60] The courts have not always been blind to this basic criterion. Thus, in Atlantic Works v. Brady, 107 U. S. 192, 200 (1882), the court said:

"The design of the patent laws is to reward those who make some substantial discovery or invention, which adds to our knowledge and makes a step in advance in the useful arts. Such inventors are worthy of all favor. It was never the object of those laws to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures. Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvement, and gather its foam in the form of patented monopolies, which enable them to lay a heavy tax upon the industry of the country, without contributing anything to the real advancement of the arts. It embarrasses the honest pursuit of business with fears and apprehensions of concealed liens and unknown liabilities to lawsuits and vexatious accountings for profits made in good faith."

cation than the "flash of genius" test. It does have the merit, however, of focusing attention on the fundamental issue involved, and to that extent has some advantage over meaningless rules of thumb and mystical catch phrases.

Even as a broad criterion, however, it requires considerable qualification and elaboration. Thus, one cannot overlook the fact that not only stimulus to invent, but inducement to invest and exploit are important considerations;[61] that a successful patent must not only pay for itself, but must pay for the many failures in inventive effort—in other words, that the speculative nature of inventive activity may call for a higher reward than would be needed for an activity in which success is assured; that once the invention is made, the public will not necessarily be deprived of the full benefits therefrom for seventeen years, since the inventor may exploit it abundantly himself, license others to do so, or infringers may exploit it if the inventor does not; that the patent may be held invalid, opening up the invention to all who wish to use it. Aside from actual exploitation, the disclosure is useful in itself since it may stimulate others to activity in the same field.[62]

There are still further qualifications to be considered. In many situations we grant patents to individuals even though it is perfectly clear that the invention could be obtained for nothing; *e.g.*, where it has been disclosed and published before a patent issues, where it has been patented in a foreign country, where another person makes the invention about the same time and either abandons it to the public or is barred for some reason from obtaining a patent. In such situations, we grant patents notwithstanding the availability of the invention, and it is proper that we do so since we have promised that we would. For that matter, in many of these situations the disclosure of the invention prior to patenting might not have occurred but for the fact that a patent would be forthcoming anyway. This will often be true where the applicant himself makes the disclosure. The simultaneous inventor may himself have been stimulated to invent by the hope of obtaining a patent. The foreign inventor may have been stimulated to invent there because he could obtain a patent in the United States.

Finally, one cannot ignore entirely the "reward" concept, even though the stimulus theory is the one upon which we probably should, and do, rely most in justifying and evaluating the patent system. If one has made a great contribution to the public good there is certainly nothing wrong in paying him for it, even though he was not induced to do so in the slightest by promises held out to him in the form of

[61] Judge Frank suggests that today exploitation may overshadow research and invention as the objective to be achieved through the patent laws:

"The controversy between the defenders and assailants of our patent system may be about a false issue—the stimulus to invention. The real issue may be the stimulus to investment. . . ." Picard v. United Aircraft Corp., *supra*, note 43, at 643.

[62] On the other hand, it must be recognized that frequently the upsetting effect of the patent monopoly does not cease with the expiration of the patent and the end of seventeen years. This aspect of the problem will be discussed later.

patent protection and even though he came by the idea with little effort or sacrifice on his part.[63]

Granting all these qualifications, it still remains true that the seventeen-year exclusive right which a patent gives is a high price to pay. It should be paid only for noteworthy, not trivial, contributions. Beyond this, even where the contribution is substantial that very fact may result in the payment of a price greater than should be paid, since the patent laws contemplate that the scope of patent protection shall be coextensive with the scope of the invention.

Although the courts are disposed to assign more or less technical reasons for their decisions in this field, it may well be that many of their decisions holding patents invalid or narrowing their scope really reflect an application of these principles. This may explain their insistence upon a high standard of invention as well as their refusal to sustain claims of extremely broad scope[64] and their limitation of the patentee to devices actually disclosed in his patent even though the invention he made, and claimed, goes farther.[65]

Unfortunately, except where a patent grant can be broadened or narrowed by judicial construction of its claims, the courts are compelled to decide cases on an "all or nothing" basis. They have no choice except to give the patentee a great deal or nothing at all. This is satisfactory enough in the occasional black and white cases. It is not satisfactory in the much more common gray cases. Having before it an invention that merits some reward, but not a seventeen-year exclusive right, the court must either award the patentee nothing or give him too much. The Patent Office is faced with the same problem. As a rough generalization, it may be said that the courts today tend to meet that dilemma by holding the patent invalid, thereby protecting the public but injuring the patentee. The Patent Office tends to meet it by allowing the patent to issue, thereby protecting the inventor but injuring the public.

Neither the courts nor the Patent Office is to blame for this unsatisfactory situation. The fault lies in the patent laws themselves—in the inflexibility and rigidity of our "one-price" patent system, wherein we offer exactly the same reward to all inventors irrespective of the extent of their contributions,[66] the amount of stimulus

[63] The "flash of genius" concept, if taken literally, is consistent with the "reward" theory, but not with the "stimulus" theory. Presumably, "flashes" do not result from hard work, extensive experiment, costly trial and error. They just happen—and probably would happen even if there were no patent to be obtained. The patent system may be the spark that sets off research effort and exploitation, but I doubt if it is the spark that sets off a "flash of genius."

[64] O'Reilly v. Morse, 15 How. 402 (U. S. 1853).

[65] Halliburton Co. v. Walker, 329 U. S. 1 (1946).

[66] In one sense, *i. e.*, in terms of the actual reward which one receives from a patent, there is a great deal of flexibility. The system is well designed to encourage effort in the fields of greatest commercial and industrial importance and discourage it in unimportant fields, by providing for a generous reward for useful inventions and a niggardly reward for those that are not useful. As one court has stated it:

"Whether it be more or less useful is a circumstance very material to the interests of the patentee, but of no importance to the public. If it be not extensively useful it will silently sink into contempt and disregard." Lowell v. Lewis, 15 Fed. Cas. 1018, No. 8568 (C. C. Mass. 1817).

This, however, is no answer to the problem under discussion, *i.e.*, how to obtain needed flexibility

needed to induce invention, or the stimulus needed to achieve exploitation. Some inventions are achieved only through extensive expenditures of time, capital and ingenuity; others may flash across one's mind and be reduced to paper at almost no cost. Some inventions require substantial capital outlay for exploitation, additional experiments and research, extensive and expensive efforts to convince the public that the new device is something it wants. Others can be tried and dropped, if they prove to be failures, without loss of time or money. Successful exploitation of some inventions is apparent from the start. The success of others is highly conjectural.

Despite these variations, we still give the same reward to all. A system in which every worker receives, say, ten dollars a day, irrespective of whether he is a college graduate or an illiterate, capable of a hard day's work or a weakling, industrious or one who soldiers on the job, would run into serious difficulties.

It is easy to point out the fault of rigidity and inflexibility. It is harder to suggest remedies. Obviously, each invention cannot be evaluated in terms of what reward was necessary in order to bring it forth and what stimulus will be needed to bring it into use, and a patent issued on that basis. Nevertheless, certain ways of achieving flexibility suggest themselves. The grant of "petty patents," comparable to the German Gebrauchsmuster, is one that has frequently been mentioned. The effect of this would be to enable those who had made some contribution, but not very much, to obtain some reward and thereby avoid the present situation wherein these borderline inventors get either far more than they should receive or nothing at all.

Other possibilities might include the intentional narrowing of claims to less than the actual scope of the invention, the denial of a right to injunction in some situations, and the use in appropriate cases of government subsidies to provide the stimulus to invent and exploit which the patent is supposed to give.[67]

Compulsory licensing, whatever may be said for or against it on other grounds, presents one of the best means of achieving flexibility. Within the limits set by other considerations, such as ability and willingness of the user to pay royalties, a royalty could be made higher or lower depending upon the research effort and expense involved in making the invention.[68] Similar flexibility is possible in dealing with incentive to exploit. Thus, licenses might be refused entirely, their grant might

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in the stimulus to research and exploitation, since there is no necessary correlation between the eventual commercial importance of an "invention" and the efforts that are needed to bring it into being and get it into use.

[67] The subsidy, in one form or another, has come in for increasing attention in recent years. BUSH, SCIENCE THE ENDLESS FRONTIER (1945); *Hearings Before the Committee on Military Affairs on S. 1297*, 79th Cong., 2d Sess. (1946); Atomic Energy Act of 1946, note 5, *supra;* INVESTIGATION OF GOVERNMENT PATENT PRACTICES AND POLICIES, 1 REP. ATT'Y GEN. 3, 6 (1947); S. 1248, 79th Cong., 2d Sess. (1946).

[68] The Atomic Energy Act of 1946, *supra*, note 5, permits consideration of this factor in determining reasonable royalties under patents useful in this field. Section 11(e)(3)(A) provides:

"In determining such reasonable royalty fee, the Commission shall take into consideration any defense, general or special, that might be pleaded by a defendant in an action for infringement, the extent to which, if any, such patent was developed through federally financed research, the degree of utility, novelty, and importance of the invention or discovery, *and may consider the cost to the owner of the patent of developing such invention or discovery or acquiring such patent.*" (Emphasis supplied.) 60 STAT. 768, 42 U. S. C. A. §1811(e)(3)(A) (Supp. 1946).

be postponed for a certain number of years, they might be limited in terms or in the number of them issued, or they might be issued to all applicants, depending upon what would best serve the broad public interest from the exploitation and investment standpoint. True, one would not know before the invention was made just what the extent of his reward would be, but one does not know that under the existing system. Nevertheless, if the entrepreneur knew that he would obtain rights which were reasonable and a reward that was fair under the circumstances, who can say that the progress of science and useful arts would not be adequately promoted? In other fields, public utilities for instance, the assurance of a fair and reasonable reward has been a sufficient stimulus to investment.

Thus far, discussion has been limited to the framework of the patent system itself and has ignored the alternative methods of inducing invention and investment. Strong incentives to invent exist other than those stemming from the patent system, some of them having little relation to the matter of material reward. Floyd L. Vaughan, in his *Economics of Our Patent System,*[69] lists a number of them: (1) the instinct of contrivance or workmanship; (2) reputation, the desire for fame, and the sense of altruism; (3) division of labor, whereby one's attention is increasingly directed to narrower fields so that one becomes more aware of the problems in the field and more proficient in solving them; (4) intellectual inquiry and curiosity which leads to discoveries; (5) scientific progress, *i.e.,* the cumulative effect of scientific advancement which feeds upon itself and leads, as a matter of course, to further advancement;[70] (6) divine inspiration; (7) accident; and (8) economic conditions, *i.e.,* the modern institutions and developments which create a demand for new products and the organization of industry on a basis such that capital and labor can cooperate to supply that demand.

These incentives are by no means the only ones. One cannot ignore the important part that competition plays in inducing invention, provided competitive forces are permitted to come into play. Inherent in the competitive concept is the effort to improve one's product in order to overcome one's competitors and to reduce one's cost of production, not only to maximize profits, but in order to survive. In these efforts research will necessarily be undertaken, at least up to the point where one feels the results are not worth the cost and sometimes beyond that point.[71]

[69] Pages 1 to 16 (1925).

[70] A refinement of this concept appears in the "invention of invention" theory. ALFRED N. WHITEHEAD, SCIENCE AND THE MODERN WORLD 120-122 (1930); WALTER LIPPMANN, A PREFACE TO MORALS 232-235 (1929). It was epitomized by Theodore Krebs in *Hearings before the TNEC,* Pt. 30, 76th Cong., 3d Sess. 16212 (1940) as follows:

"But after 1850 the progress of science, particularly of the physical sciences, became so systematized that the invention of a product was first blueprinted before realized by processes of deduction and synthesis in the industrial plant."

The implication seems to be that invention is reduced to nothing more than a logical process which anyone skilled in the art can carry through, arriving at an answer as surely as a bookkeeper, given time, can arrive at the total of a column of figures. Its full implications *vis a vis* the patent system would call for a study of the inventive process and the nature of invention to an extent beyond the scope of this paper.

[71] Factors which may tend to push research beyond the point where it will pay for itself include

It is not suggested that the stimuli just discussed would completely or even substantially supplant the inducement to invention and exploitation that the patent system offers. Their presence does suggest, however, that even the complete abandonment of the patent system would still leave us with considerable incentive to invent and exploit.

Accepting the proposition that a direct reward is necessary if the desired degree of invention and exploitation is to be obtained, are there means of obtaining it other than the grant of a seventeen-year exclusive right? The right to a royalty for the use of an invention without the power of exclusion has already been suggested as a possibility which might well provide sufficient incentive and at the same time avoid many of the more serious adverse effects of our present system.

There is also the possibility of subsidy, either for the purpose of stimulating research or for the purpose of exploitation.[72] Subsidies have always played an important part in our political and economic structure. Government subsidies are not dangerous *per se*. The danger rather lies in the encroachment by government upon private fields of activity where such encroachment is unnecessary. The question whether government subsidy is necessary or desirable in the field of technology and research is beyond the scope of this paper.[73] If, however, it be conceded that research is a highly important national resource the development of which is of paramount public interest, it would seem to follow that if that development cannot be obtained through private effort without paying a price that is higher than the public should pay, the Government may, and perhaps should, use its efforts—and the taxpayers' money—to obtain the necessary results at the proper price. On principle it is difficult to see wherein the situation would be different from that which resulted in such activities as operation of the postal system, the public roads, the public schools, the imposition of tariffs, and more recently, aids to private business through RFC loans and support prices. Indeed, the patent system itself may be viewed as akin to a subsidy.[74] The allowance of tax credit for research expenditures comes even closer.

The foregoing discussion has been directed mainly, although not entirely, to the question of incentives to invent. What about alternative incentives to exploit

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(1) the optimism to which the human race is fortunately addicted, (2) pride in one's product, (3) fear of being outstripped by one's competitors, and (4) a tax situation such that a substantial portion of income would be paid to the government in taxes if it were not used instead for research.

[72] *Supra*, note 67. The Atomic Energy Act of 1946, note 5, *supra*, presents an interesting experiment in compulsory licensing, subsidy, and payment of compensation by the Government for inventions. See §§3 and 11.

[73] One thing is clear. One cannot be complacent about a situation in which, notwithstanding the existence of our present patent system for over one hundred years, it has recently been deemed necessary to develop atomic energy under government sponsorship, albeit through private organizations to a large extent, to pass an Atomic Energy Act which contemplates a continuation of such sponsorship, and to pass a National Science Foundation bill (which was vetoed) contemplating government support of research to a far greater extent than in the past.

[74] This is clearly borne out when one examines the historical antecedents of our patent system. Patents for invention developed ancillary to a studied and deliberate subsidy policy designed, at least in its origin, to further the public interest. Fox, *op. cit. supra*, note 3, 188-189.

inventions, once they are made? Here again, the use of subsidies, to the extent necessary to obtain desirable production *in the public interest,* provides at least one alternative. Beyond this, one may ask whether it may not be much easier today to induce private enterprise to enter new fields of activity than it was when our patent system was inaugurated and for a long time afterwards. Granting the existence of many bothersome barriers to new business and the continued adherence of private sources of capital to a "safety psychology," the fundamental necessities, barring the temporary problems created by the war, are probably more readily available today than they have ever been before. These include information, technological and other, on how to start and conduct a business; materials; facilities for getting one's product before the public and acquainting the public with it; and the necessary capital, obtainable through government loan if not through private institutions. Finally, developments in labor-saving machinery have created a situation in which we possess a constant oversupply of manpower.

IV

THE REAL PRICE WE PAY

Up to this point we have assumed that the price the public pays for an invention is the price which the patent law says we pay, namely, a seventeen-year right to exclude others from making, using and vending. We have seen that, in fact, there may often be some divergence from this standard as a practical matter, sometimes to the public's benefit, sometimes to the patentee's benefit. But granting correct interpretation and adequate disclosure of the invention, availability of remedies and court processes to the would-be users as well as the patentee, and so on, we have assumed that this is the price we pay, and the only price we pay. The remainder of the discussion is addressed to this assumption. Do we in fact give the patentee something more than a seventeen-year monopoly, directly or indirectly? Do we give him less?

In some respects, there is no doubt that we give him less. Most of the ways in which this comes about have already been discussed, such as denying validity to a patent notwithstanding a substantial contribution, unduly narrowing a patent's scope by interpretation, and denying the patentee effective recourse to the courts to prevent or recover for infringement. Beyond this, we may often get something for nothing, simply because the public does not see fit to use the invention during the patent's lifetime.[75] Patents otherwise valid may be rendered unenforceable as a result of misuse.[76]

[75] Although non-use suggests non-utility in most cases (note 66, *supra*), this is not always true. Important inventions may be made before their time, with the result that by the time they become really valuable the patent will have expired. Even useless inventions may contain ideas which inspire later developments that prove useful.

[76] Leitch Mfg. Co. v. Barber Co., 302 U. S. 458 (1938); Morton Salt Co. v. G. S. Suppiger Co., 314 U. S. 488 (1942); B. B. Chemical Co. v. Ellis, 314 U. S. 495 (1942); Mercoid Corp. v. Mid-Continent Invest. Co., 320 U. S. 661 (1944); Mercoid Corp. v. Minneapolis-Honeywell Regulator Co., 320 U. S. 680 (1944); *cf.* Hartford-Empire Co. v. U. S. 323 U. S. 386 (1945); *id.,* 324 U. S. 570 (1945); United States v. National Lead Co., 67 Sup. Ct. 1634 (1947).

The extent to which a patentee may obtain greater rights than the patent laws ostensibly give him is a more complicated matter.[77] A given patent, standing alone, is limited to the seventeen-year exclusive right. In practical effect, however, under present methods of operation, a patentee sometimes obtains substantial advantages at the expense of the public which go beyond the scope of his contribution and last much longer than the seventeen years contemplated by the statute. These advantages may arise in three ways: (1) through direct extension of the period of exclusive right beyond seventeen years; (2) through extension of the patent monopoly to cover areas, activities, and fields which lie outside the limits of the patent claims; and (3) through institutional and industrial developments, advantageous to the patentee but detrimental to the public, which may persist long after the patent has expired.

The first category, and probably the least important in actual effect, is illustrated by delay in the issuance of patents.[78] It is unlikely that many inventors deliberately delay the issuance of patents, and in fact most patents issue within three years after application. Nevertheless, a sufficient number of applications remain pending for five years or more, and extreme cases of flagrant delay involving important patents occur with enough frequency, to make the problem a fairly important one.[79] In one respect the applicant might be deemed to suffer rather than benefit from this lag, since prior to issuance of the patent others may use the invention with impunity, although it is true that the inventor benefits correspondingly at the other end. On the other hand, the applicant may derive a great benefit through delay in issuance of the patent since others, especially if an extensive investment is involved, will be unlikely to use the invention during the application period, knowing they may be compelled to discontinue use when the patent issues.

The second category involves more serious problems. The efforts of a patentee to extend his monopoly beyond the scope of the patent may take many forms. Although such practices have frequently been held illegal by the courts, they continue to be used and their existence cannot be ignored in determining the price we pay for inventions.

One of the practices has been the use of the so-called tying clause, whereby the patentee licenses the use of his invention on condition that the licensee use unpatent-

[77] Some aspects of this have already been discussed, such as the upholding of patents that should be declared invalid, and denial to the public and "infringers" of effective protection against spurious patents.

[78] Excluded from consideration are those situations in which Congress deliberately extends rights under patents by special legislation. Whether such extensions are justified in the public interest is irrelevant to the present discussion. Act of May 31, 1928, *supra*, note 52; 58 STAT. 1095, *supra*, note 51.

[79] *Hearings before the TNEC*, Pt. 3, 76th Cong., 1st Sess. 1132-1135 (1939). The most frequently suggested solution for this problem is enactment of a "twenty-year" law which would limit the patent term to a period of seventeen years from date of issue or twenty years from date of application, whichever is less. Although such legislation has met with general approval, none has yet been enacted. See *Hearings before the Committee on Patents on H. R. 2361*, 79th Cong., 1st Sess. (1945). With limited application, a twenty-year provision is contained in the Boykin Act, which extends the rights of foreigners to apply for patents on the basis of prior foreign application. 35 U. S. C. A. §110 (Supp. 1946).

ed products obtained from him rather than from his competitors. The effect, of course, is a substantial competitive advantage to the patentee in the sale of unpatented goods. The practice has been uniformly condemned as an attempt to use the patent monopoly to control commodities not covered by the patent. It has been held to be contrary to the patent laws,[80] an abuse of the patent privilege which renders the patent unenforceable until the effects of the abuse are dissipated,[81] and a violation of the antitrust laws.[82] Nevertheless the practice still persists.

Another device, somewhat similar to the tying clause, is "package" licensing, *i.e.*, refusal to license one patent unless the licensee accepts licenses under others. The licensee is thus denied the opportunity to accept or reject a given invention. He is compelled, through his need for one patent right, to pay for other rights which he does not want or which he believes—but cannot assert[83]—to be invalid. Thus are stopped the mouths of those who may be in the best position to show the invalidity of specific patents, contrary to the public interest in preserving freedom for such a showing.[84]

Another type of tying, commonly used and conducive to the concentration of patents in a single owner, consists of a patentee's requiring, as a condition of licensing, that the licensee assign back the future related inventions he makes.[85]

Improvement patents also become a device for extending one's patent monopoly. True, the original patent expires at the end of seventeen years and is available to anyone who desires to use it. But this is not always sufficient to assure effective competition. Competition, in many fields, is a delicately balanced matter with the advantage going to the one who offers the best product even though its advantage over competitive products may be slight. If a holder of a dominant patent can obtain improvement patents which enable him to continue to put out a better product, after expiration of the basic patent, than his competitors, he may continue to enjoy a substantial competitive advantage, an advantage which is aggravated by his exclusive possession of the field for seventeen years, during which he has established himself on the inside track from the standpoint of goodwill, sales organizations, proficiency and know-how, outlets, etc.

Competitors can, of course, prevent this from happening by conducting vigorous

[80] Carbice Corp. v. American Pats. Development Co., 283 U. S. 27 (1931); Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U. S. 502 (1917).

[81] See cases cited *supra*, note 76.

[82] International Bus. Machines Co. v. United States, 298 U. S. 131 (1936); Ethyl Gasoline Corp. v. United States, 309 U. S. 436 (1940); Mercoid Corp. v. Minneapolis-Honeywell Reg. Co., 320 U. S. 680 (1944).

[83] United States v. Harvey Steel Co., 196 U. S. 310 (1904). *Cf.* Stentor Elec. Mfg. Co. v. Klaxon Co., 115 F. 2d 268, 272-273 (C. C. A. 3d 1940); Sola Elec. Co. v. Jefferson Co., 317 U. S. 173 (1942); Scott Paper Co. v. Marcalus Co., 326 U. S. 249 (1945); MacGregor v. Westinghouse Elec. & Mfg. Co., 329 U. S. 402 (1947).

[84] Pope Mfg. Co. v. Gormully, 144 U. S. 224 (1892); Sinclair & Carroll Co., Inc. v. Interchemical Corp., 325 U. S. 327 (1945).

[85] The Supreme Court recently held this practice unobjectionable in the absence of a showing of antitrust violation. Transparent-Wrap Mach. Corp. v. Stokes & Smith Co., 329 U. S. 607 (1947).

research in the field themselves, looking to the acquisition of improvement patents. But as a practical matter the improvement patents are more likely to be found in the hands of the basic patent owner. This for three reasons. First, the dominant patentee constitutes the most likely market for improvement patents independently developed. Second, as indicated above, he may compel licensees, if he does license, to funnel their improvements into his hands. Third, since he alone is in a position to use improvements immediately, he has a greater interest in conducting research in the field than have his competitors, who must perforce await the expiration of his basic patent before they can use any improvements they develop.

Trade-marks also provide a means for retaining a competitive advantage after patent protection has been lost. A trade-mark attached to a patented article, because it is the only name which the public associates with the article, easily becomes identified with the article itself rather than with its producer. As a result, it may be virtually impossible for others to compete effectively, after the patent expires, unless they can use the same mark. In extreme cases the courts have helped to remedy the situation by declaring such marks to be generic in nature and available for use by all producers of the product.[86] It has not been suggested, however, that if the patentee takes appropriate measures to maintain his mark as an indication of origin rather than a description of the article he will lose his exclusive right to it.[87]

Yet, even though the mark is preserved as an indication of origin, the tremendous advantages arising out of public familiarity with the mark—advantages which are greatly augmented by the effective and extensive advertising methods of today—may give the patentee great advantages difficult indeed to overcome.[88]

Trade-mark protection is only one example of the many indirect but highly important competitive advantages that may develop during the seventeen-year period of monopoly. General reputation, development of sales outlets, creation of customer goodwill, the general "know-how" which comes from long operation, all add up to give the patentee an advantage which new competitors in the field may find it difficult, perhaps impossible, to overcome.

The third category, namely, the development of undesirable institutional, commercial, and industrial practices, is the most serious collateral price we pay. These take three main forms: (1) concentration and monopolization of patents in the hands of a single owner; (2) elimination of competition through the division of territories and fields of activity; and (3) the adoption of selective and restrictive

[86] Singer Mfg. Co. v. June Mfg. Co., 163 U. S. 169 (1896); Bayer Co., Inc. v. United Drug Co., 272 F. 505 (S. D. N. Y. 1921); Kellogg Co. v. National Biscuit Co., 305 U. S. 111 (1938).

[87] *Cf.* §§14(c) and 15(4) of the Lanham Trademark Act, 60 STAT. 433, 15 U. S. C. A. §§1064(c) and 1065(4) (Supp. 1946).

[88] It may be questioned whether the use of a trade-mark with a monopolized article has any place in modern trade. Whatever its original purpose, the trade-mark today is used almost entirely to distinguish one's goods from those of a competitor. Where no competitor exists, does it serve any legitimate purpose? Would it be unreasonable to require that a patentee identify his monopolized product only by its descriptive name and compel him, when his patent expires and competition enters the field, to start from scratch?

licensing practices which eliminate competition in various ways and set up patterns of non-competition which may continue long after the patents which brought them into being have expired.

The tendency of patents to concentrate in a single owner has already been discussed to some extent. It is necessary here only to reiterate that once a given organization becomes dominant patent-wise in a certain field, the likelihood is great that it will increasingly strengthen its patent position *vis a vis* its potential competitors through acquisition of other patents, through patents obtained as a result of its own research, or through discouragement of research by others. There may eventually result a tremendous concentration of technology in the hands of a single organization which enables it to render competition completely ineffectual, eliminate competition entirely, or, what is not much better, permit it to exist only by sufferance. Such a result, I suppose, is good enough for those countries dedicated to a system of state monopolies. It is not consistent with our democratic concept of well-balanced competition and free competive enterprise.

Where situations have not reached the point of virtually complete concentration another tendency shows itself, the tendency of powerful organizations which could effectively compete with one another to divide activities or territories among themselves, often on a world-wide basis, each agreeing to keep out of the other's field. Patents often play an important part in such conspiracies. Not only are they frequently used as the colorable justification for the agreements, but they provide a powerful instrument for making them effective. By cross-licensing or cross-assigning their respective patent rights, each party to the agreement is provided with a powerful legal weapon, *i.e.*, suit for infringement, by which he is able not only to exclude the other from his assigned territory and thereby force him to abide by the agreement, but also to exclude outsiders who might otherwise intrude and upset the careful scheme of non-competition which has been worked out.[89]

This type of agreement finds its counterpart in the "patent pool," whereby a number of competitors may render their patents available to the respective parties to the agreement. Even where the pool is a so-called "open" one to which any applicant may be admitted, it may have the tendency to cause "rationalization" of an industry rather than competition in it. Where it is a closed pool, *i. e.*, one to which only the favored few or those who are willing to conform to certain policies can gain admittance, these tendencies are aggravated and it is open to the additional objection that it enables a segment of the industry to band together to the detriment of outside competitors.

This is not to suggest that pools should be prohibited. The prevalence of overlapping patents often makes it impossible to use the best technology effectively without impinging upon a number of related patents. Unless the patents happen

[89] The practices here discussed are, of course, inconsistent with one of the justifications urged for the patent system, namely, that the grant of exclusive rights will stimulate others to "invent around" the patented invention and thereby achieve further technological advance.

to be concentrated in the hands of a single owner, this may mean obtaining the consent of several different patent owners before one is free to go ahead. The patent pool accomplishes a useful purpose in solving this problem. The danger lies in the fact that patent pools, like trade associations, sometimes become diverted from their legitimate and proper purposes into more questionable paths. Technology being what it is, patent pools probably are an essential instrument in today's economy. But, in view of the power that they wield, the choice seems fairly clear: either they must do a thorough job of self-policing or the Government must take on the job of regulating them and their policies to assure that the paramount public interest is promoted, not thwarted.

The third practice which has unfortunate repercussions on our competitive economy is that of selective and restrictive licensing. It is not uncommon for patentees to grant licenses on condition that the licensee adopt certain price policies, limit his production, contain himself within certain territories, abide by specified standards, operate only within certain fields of activity, etc. While many of the practices in question have been held improper by the courts, they still persist.

Some of these restrictions may be justifiable, if we look at them from the standpoint of the patent laws alone, on the ground that the patentee is merely dividing up his patent and parceling out bits of it to selected individuals. Others, again looking at them from the standpoint of the patent laws alone, have been defended on the ground that the patentee will simply withdraw into his shell and refuse to license altogether unless he can impose them. The merits or weaknesses of these contentions are beyond the scope of this paper. I do point out, however, that the effect of these practices, whether they are justified or not, is to set up a pattern of price control, quality control, and elimination of competition which may become so firmly established during the period the patent is in effect that it will continue to persist long after the patent has expired.[90]

Further unfortunate possibilities relate to the field of research itself. The day of the garret inventor may well have passed. Research today has become big business, involving extensive and expensive laboratories and large staffs of skilled scientists. It is becoming less and less open to the small businessman. I do not argue the question whether research conducted on this basis is more efficient or achieves greater results in terms of the effort expended than were achieved in the earlier, more individualized, more haphazard types of research. The important fact is that research has, to a large extent, become an activity which is closed to the average man except as an employee of a huge, impersonal organization.

[90] Even though the patentee might retain the field exclusively to himself were he not permitted to license on a restrictive basis, it may be that in some situations the public interest would be better served by complete exclusion than by the imperfect competition that results from restrictive licensing. The pattern of non-competition that develops over a number of years may be easier to get rid of if everyone starts from scratch. There would at least be some incentive to infringe (thereby exposing the invalidity of spurious patents) and to "invent around." Finally, depending on the facts, one may ask whether, if we are to be deprived of the benefits which normally flow from competition, we should not at least get such advantages as it is alleged may flow from the concentrated production of the monopolist.

This presents a basic problem. If, as may be true, the big-business type of research is inevitable and if, as may be true, research from now on is to be conducted largely by huge organizations rather than by individuals working in their garages and basements, we must ask whether these research organizations shall be private or public, whether they shall be free to dictate their own policies or subject to some control in the public interest, and whether the public interest can permit them to ally themselves with equally large industrial organizations and to be used as an instrument for the further advantage of the latter.

I do not say how these issues should be determined. I do say they cannot be ignored in arriving at a proper evaluation of the present patent system.

V

SUMMARY AND CONCLUSION

The major problems that face the patent system today, and the difficulties that stem from that system and arise to plague the patent owners as well as other members of the public, may be summarized as follows:

1. The "one-price" reward given for patentable inventions, despite the great variations between one "invention" and another in terms of relative contributions and relative expenditures in time, money, and effort, has led to an unsatisfactory situation in which either the public is called upon to pay a high price for a moderate contribution (if the patent is held valid) or the inventor is denied any reward for his contribution (if it is held invalid).

2. The problem has been aggravated by the necessity for relying upon legal procedures that are complex, time-consuming, and expensive, with victory often dependent not on the merits but on one's financial ability to sweat it out.

3. Even where a decision is achieved, supposedly on the merits, the occasional failure of the judge to center his attention on the constitutional objective of the patent system, *i.e.*, the *promotion* of the progress of science and useful arts, and his resort to meaningless shibboleths and catchwords, makes it a lively question whether the decision will be right or wrong.

4. The foregoing difficulties, all of which go to create uncertainty as to the validity or invalidity of a given patent, are enhanced by the great numbers of patents issued and outstanding, a large proportion of which, because of the lower standards of invention followed by the Patent Office, would be declared invalid if subjected to litigation.

5. Even where a really substantial invention has been made, the question arises whether a seventeen-year exclusive right is not too high a price to pay, considering the greater abundance and availability today, as compared to a time a hundred years ago, of the physical, human, financial, and intellectual materials that are needed to conduct research and start a business; put another way, if less stimulus is needed than in the past to induce research and exploitation, it is improvident not to offer less.

6. The uses to which patents are put and their effect upon the interplay of competitive forces are quite unlike what they were when the patent system was developed. Whether this is the result of greater concentration of industry, greater interdependence between different segments of industry, greater volume, concentration, or overlapping of patents, or whatever the reason, patents play new and different roles in our economy, even though they may at the same time play the same old role. Their effect must be determined in the light of what they do today, not what they have done in the past.

7. It would appear that research is becoming increasingly a big-business matter, a cooperative or collectivist project. The trend toward concentration of research in the hands of the few means a corresponding or even an increasing trend toward concentration of patents in the same hands. Concentrated patent power, especially when coupled with concentrated industrial power, can become a formidable threat to an economy dedicated to free competitive enterprise unless considerable self-control, or some other less desirable form of control, is exercised.

The plain fact is that our economic society, in which the patent system plays a highly important part, bears little resemblance to the economic society into which that system was born. It is doubtful whether the Founding Fathers, if this is important, ever visualized a situation in which the patent system would be anything other than what it was at that time—a simple device for inducing invention and exploitation at a time when both were difficult and greatly needed in an economy of scarcity, a system under which the patentee would exploit his patent to its fullest advantage through actual production, and with none of the overtones we have today wherein it becomes an instrument which seriously affects entire industries, world activities, and the whole broad competitive economy. It is in its relation to our highly industrialized and complex modern economy of abundance, not in its relation to a simple, largely agrarian economy of scarcity, that the patent system must be examined.

It does not follow, as Judge Hand has suggested, that "perhaps the system is outworn."[91] And as Judge Frank, and others, have said, "we should not throw out the baby with the bathwater."[92] Or, to quote from a level of society somewhat below that of the Circuit Court of Appeals for the Second Circuit, "theres a dance in the old dame yet."[93] What does follow, it would seem, is this: The extent to which our patent system operates for good or evil in our present economy and the extent, if any, to which it should be modified to accomplish the greatest good, and the ways in which it can be adapted to carry out the constitutional purpose and still accommodate itself to the broader and overriding concept of a free competitive enterprise, are matters which cannot be determined by futile references to the past or broad generalities. They can only be determined by hard grubbing into the facts.

[91] Dewey & Almy Chemical Co. v. Mimex Co., 124 F. 2d 986, 990 (C. C. A. 2d 1942).
[92] Picard v. United Aircraft Corp., 128 F. 2d 632, 643 (C. C. A. 2d 1942).
[93] DON MARQUIS, *the lives and times of archy & mehitabel* 26 (1927).

The most important considerations to which these factual investigations should be directed, in my view, are the following:

To what extent is there a lack of coordination between the reward which is given for an "invention" and the reward that is needed in order to accomplish the constitutional objective of promoting the progress of science and useful arts; and what modifications might be made to achieve a closer coordination and greater flexibility than now exists?

Is the right to exclude a *sine qua non* of an effective patent system or are there alternative rewards which will provide adequate inducement for invention and exploitation and still avoid the unfortunate monopolistic effects which result under the present system?

What legal and quasi-legal devices can be developed to enable the courts and administrative bodies to carry out the policies and achieve the objectives of the patent system more effectively than is done at the present time?

Might the "progress of science and useful arts" be furthered by government participation in the effort, beyond the present participation consisting of granting patents for invention? If so, what should be the form and scope of such participation? Should it embrace those research activities which private industry is not prepared to undertake, even with the stimulus provided by the patent system, *e. g.*, certain types of basic research, atomic energy, etc.? Or should the Government go farther and play the role which it has sometimes played in other fields—using its resources to keep our economy on an even keel by throwing its weight into one side of the scale or the other to provide and stimulate competition in research—and, if it can be done, restore the small business or individual inventor to a place in the research field?

Does the present interrelationship between productive industry and research pose problems for free competitive enterprise which can be solved only by the divorcement of business interests from patent interests? As a less drastic alternative, might business interests be permitted to retain a patent position, but only on condition that the patents be endowed with a "business affected with a public interest" concept, connoting the common-law obligations of such a business to serve all without discrimination and at reasonable rates?

Until serious attention is given to these basic issues, efforts to patch up the system here and prune it there will have little more significance than taking aspirin for a headache caused by a basic illness.

PATENTS AND UNIVERSITY RESEARCH

ARCHIE M. PALMER*

Research is conducted on the university campus as an integral part of the educational program, with a view to expanding the frontiers of human knowledge, encouraging and stimulating the spirit of inquiry, and contributing toward the training of scientific personnel. It is concerned with the discovery and dissemination of new ideas, so essential to scientific and technological progress. Some of these new ideas have valuable commercial application; others should be controlled in the public interest. In the handling of such results of university research the question of patents is involved.

The patent law[1] provides that any new and useful art,[2] machine, manufacture, or composition of matter, any new and useful improvement thereof, or any distinct and new variety of plant (other than a tuber-propagated plant) which has been asexually reproduced is subject to patent. Under this provision of the law many of the products of university research can be patented.

However, scientists working in university laboratories are, in general, content to pursue their investigations without thought of the practical application of the results. The discovery and development of patentable inventions are not primary objectives of their research efforts. They feel with Sir Henry Dale that "the primary and special function of research in the universities is to build the main fabric of knowledge by free and untrammelled inquiry and to be concerned with the practical uses of it, only as these arise in the course of a natural development."[3]

I

The attitude is taken by many scientists, especially those working in universities, that the publication of the results of scientific research or the dedication of their findings to the public is sufficient. However, as President Karl T. Compton of the Massachusetts Institute of Technology said in his annual report for 1932, "Responsibility does not always end with mere publication of a patentable scientific discovery or invention; the public benefits derivable from the patent laws and contemplated by the framers of those laws should not be lost through a failure to solicit patent protection."[4]

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[1] REV. STAT. §4886 (1875), as amended, 35 U. S. C. §35 (1940).

[2] Interpreted by the courts to include "method" or "process."

[3] Dale, *Academic and Industrial Research in the Field of Therapeutics*, 77 SCIENCE 525 (June 1933).

[4] Technology Review, Dec. 1932, p. 101, col. 2.

Discoveries or inventions that are merely published, and are thus made available to everybody equally, are seldom adopted, despite their possibilities of commercial application. As Elihu Thomson so aptly put it:

> Publish an invention freely, and it will almost surely die from lack of interest in its development. It will not be developed and the world will not be benefited. Patent it, and if valuable, it will be taken up and developed into a business.[5]

Yet, some well-meaning scientists look askance at the patenting of the results of their investigations as if it were a rather selfish and ungracious act, essentially unworthy and unethical.

Writing in *Chemical and Metallurgical Engineering* in 1921, William J. Hale defended the patenting of the results of university research work:

> There is nothing dishonorable in a university scientist seeking a patent. On the contrary, he gains enormously thereby in international prestige. Of course, he usually is condemned at home by the university drones unable to comprehend the value of ideas other than their own; but such childish criticisms are negligible. No true scientist doubts for a moment the rights of a man to patent his own inventions. The great majority of our well-known chemists of England, France, and Germany are holders of patents in their respective countries.[6]

The patenting of the product of creative or inventive research need not necessarily bring direct personal profit to the research worker himself, even though the patent proves to be commercially profitable, nor need it distract his interest from fundamental research through the lure of greater rewards from work with patentable possibilities.

Financial rewards are not the essential or necessary objectives in obtaining patents. Of even greater importance are the protection of the public against exploitation by irresponsible or selfish persons, the regulation and control of the purity or reliability of the manufactured product (particularly in the case of a medical discovery), facility in licensing responsible concerns which can effectively commercialize the invention and invest sufficient capital to manufacture a product of appropriate quality without fear of unfair competition and piracy, the introduction of the invention to the public through proper channels and under the proper controls, and the provision through patent protection for unhampered further development—all in the public interest.

In discussing whether university patents are ethical, Yandell Henderson of Yale University has said:

> Inventions, like all other new ideas, have generally to be forced on conservative mankind. It would be easy to point to many inventions and other applications of discovery now saving large numbers of lives that would not yet be in use without advertising and the efforts of salesmen. Without commercialization a large part of all the scientific ideas that are now in constant and active use in our daily lives would be locked in books on the

[5] Thomson, *Address before Graduating Class, Massachusetts Institute of Technology*, 75 ELECTRICAL WORLD 1505 (1920).

[6] Hale, *University Researchers Should Patent Discoveries in Their Own Names*, 25 CHEMICAL AND METALLURGICAL ENGINEERING 913-914 (1921).

dusty shelves of university libraries. It is properly the business of the creative scholar to see to it that, if possible, his ideas serve mankind in his own generation.

But an even stronger duty rests on a discoverer or inventor. He should see to it that his idea or invention is not misused. He should control it. He should find one or more high-grade concerns to develop it. He should afford them at least such little protection as a patent gives against cut-throat competition, after they have spent money to put the invention into practical form and have made a market for it. Without some assurance of such protection it is difficult to get an idea developed and commercialized. The inventor should so far as possible prevent the sale of inferior or harmful imitations.[7]

A practicing physician, Elmer L. Sevringhaus, sums up the advantages which can be obtained from patenting in an article entitled *Should Scientific Discoveries Be Patented?*, written in 1932 when he was on the staff of the University of Wisconsin:

The public is thereby protected against certain ruinous types of exploitation. Assurance can be gained that technical processes are used in dependable ways. Even the publicity may be kept on a satisfactorily high plane. Rapid development of discoveries which are of academic interest may be secured when patent rights assure a commercial producer of protection in the field.[8]

In a report on *The Protection by Patents of Scientific Discoveries,* published in January, 1934, the Committee on Patents, Copyrights, and Trademarks of the American Association for the Advancement of Science cited as some of the more pronounced objections frequently voiced against patenting the results of university research:

1. That it is unethical for scientists or professors to patent the results of their work;
2. That patenting will involve scientists in commercial pursuits and leave them little time for research;
3. That publication or dedication to the public is sufficient to give the public the results of the work of scientists;
4. That patenting leads to secrecy;
5. That a patent policy will lead to debasement of research;
6. That patents will place unfortunate strictures on other men who subsequently do fundamentally important work in the same field;
7. That it is debatable whether one man should receive credit for the final result he obtains after a long series of studies has been carried out by others before him;
8. That the policy of obtaining patents will lead to ill feeling and personal jealousies among investigators; and
9. That the act of securing patents is in itself evidence that he (the scientific investigator) desires financial profits from his work.[9]

After analyzing these objections and seeking answers to them in the literature and in the personal experiences of the members of the committee and other interested scientists, the committee reached the conclusion that the patenting of the

[7] Henderson, *Patents Are Ethical,* 77 SCIENCE 324-325 (March 1933).
[8] Sevringhaus, *Should Scientific Discoveries Be Patented?*, 76 SCIENCE 233 (Sept. 1932).
[9] The Protection by Patents of Scientific Discoveries, Report of the Committee on Patents, Copyrights and Trademarks, American Association for the Advancement of Science 8-13 (1934).

results of research which have some commercial importance or industrial application is highly desirable:

> Our patent laws have been enacted in accordance with the provision in the Constitution, "to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."
>
> The investigator who takes advantage of our patent laws is therefore perfectly warranted in his act not only for any possible financial returns but also for the good of the public. The obtaining of some remuneration from a patent is no more debasing or tainted with commercialism than the acceptance of copyright royalties from a textbook or even receiving a salary for teaching. We are at present living in an economic structure in which the making of legitimate profit is a fundamental assumption.
>
> The recent economic crisis has reduced the funds available for research to an alarming extent. Scientists are therefore warranted in legitimately obtaining funds from the results of their own work whenever they can do so by patents. In this way they will be able to finance their own work, extend their researches, and at the same time make contributions both to science and industry.[10]

In its report the committee also pointed out definite advantages in securing patents on important scientific discoveries, since only by means of patents can the legal right be secured to exclude others from practicing a given process or commercializing a new product:

> By having such control of new discoveries the investigator is assured that his results will be used only for proper and meritorious purposes. He can prevent the exploitation of the public by dictating the terms under which his patent should be worked and even control the character of the commercial advertising.[11]

II

Interest in science and scientific research, particularly in the physical and natural sciences, has been intensified and accelerated as a result of our experiences during the war. Research workers and scientific investigators from the university campus and industrial laboratory aided materially in the magnificent record our nation made in war production and military achievement. Returning now to the campus and the laboratory, on release from wartime responsibilities and occupations, they are more research-minded than ever. Interest in research is being further stimulated by government and industry, which are turning to universities and technological institutes for assistance in solving postwar problems.

American science faces a challenging future. Can science be mobilized for peacetime purposes as effectively as for war? Will scientific investigation be conducted under conditions favorable to the search for new knowledge? Can we build upon and utilize our wartime experiences and the present research-consciousness among scientists and the public generally? How will our universities, the primary source of independent scientific investigation, respond to the challenge? These are ques-

[10] *Id.* at 14.
[11] *Ibid.*

tions of paramount importance if this nation is to discharge its responsibilities and assume leadership for peace and progress in the postwar era.

Of direct concern to university administrators and scientists engaged in the formulation and conduct of research programs is the policy or procedure to be followed in handling the results of scientific investigation. How can the greatest public benefit be obtained from new discoveries and inventions? Specifically, how should these discoveries and inventions be administered in the public interest, taking into account the objectives of the institutions and the over-all welfare of the scientific workers?

Whether we are to enter upon a rich era of productive research, building upon and utilizing our wartime experiences and the present research-consciousness among scientists and the public generally, will depend to a large extent upon the philosophy behind our university programs and the administration of those programs. The public welfare, educational objectives, direction of scientific thought, and advancement of knowledge are all involved.

As a service to American higher education and to the scientific fraternity, the National Research Council has been making a comprehensive study of this problem. As a first step, a factual survey[12] is being made of the prevailing policies, procedures, and practices in educational institutions and nonprofit organizations for the administration of patentable results of scientific research, with a view to the early publication of the findings for the information and guidance of all concerned. Through correspondence, conversations, and visits to university and other research centers all available information is being assembled concerning existing practices and present thinking, in administrative and scientific circles, about research policies and patent management programs.

At present there is a wide diversity of practice among educational institutions —and even at the same institution—in dealing with patentable discoveries and inventions growing out of scientific research. There is no common pattern of policy statement, administrative procedure, recognition of inventor, determination of equities, assignment requirement, patent management plan, distribution of proceeds, or protection of the public interest. Nor is there any convenient grouping according to type or size of institution, complexity of university organization, or kinds of research undertaken. Existing practices vary from strictly drawn patent policies to laissez faire attitudes and even an unwillingness to become concerned with the problem.

Some institutions follow a hands-off policy, leaving to the individual inventor the responsibility for determing what disposition is to be made of the product of his research efforts. Others take the position that the institution has an interest in all research activity on the campus and have established formal patent policies or follow generally accepted practices for handling any patentable discoveries that

[12] Palmer, *University Patent Policies*, 33 ASSOCIATION OF AMERICAN COLLEGES BULLETIN 167-174 (March 1947).

may result. Still others observe a definite policy of not having a patent policy. However, a great many have given little or no consideration to the patent problem, despite the increasing volume of scientific investigation on the campus.

Through the years certain institutions, faced with immediate situations, have formulated more or less definitive patent policies. Yet less than forty institutions have formally adopted such policies thus far, more than half of them during the past five years. At a number of other institutions practices and procedures are being currently followed which, though not definitely formalized, are generally accepted as applicable to research activities throughout the institution. A few have adopted special policies or recognize general practices for dealing with those results of scientific investigation that affect public or private health. Others have developed policies and practices only with respect to sponsored research.

Many of the existing policies and most of the prevailing practices are currently under review to meet changing postwar conditions and current considerations in the institutions. The need at this time for critical examination of the whole question of what to do with the patentable products of research, and also of its relation to scientific research programs and the over-all policies of the institutions, is recognized by those concerned with these programs and with the general administration of the institutions. Faculty and trustee committees are currently studying the question at a number of institutions, many of which have not previously had any patent policy, with a view to formulating new policies or revising existing ones.

III

At a number of institutions each case is decided on its individual merits in accordance with a general policy or, in the absence of such a policy, by agreement among the parties concerned. A few still feel that they discharge their responsibility by merely publishing the results of investigations or by securing patents and dedicating them to the public. Others accept full responsibility for obtaining patents and administering the patent rights in the public interest. Many exercise control over the patents by issuing licenses and accepting royalty payments, either directly or through a designated patent management agent.

Some recognize the rights and interests of the inventor and share the proceeds with him, either under a prior contractual arrangement or by mutual agreement. There is no uniformity in the division of the financial return from patents between the inventor and the institution. In some institutions the amount given the inventor is specified in accordance with a general policy, with a wide variation among institutions in the proportion allotted to the inventor. In others the inventor's share is determined in each case after consideration by a special faculty or administrative committee. A few institutions include patent provisions in their contracts of employment, in some instances for all faculty members but more often limited to members of the staff whose entire or major responsibility is research, especially contractual research.

At most institutions the compulsory assignment of patent rights is not considered desirable, except in connection with cooperative or sponsored research. Voluntary assignment is preferred and in many institutions is encouraged and facilitated either through procedures and special machinery for handling patents set up within the institution or through the services of an outside organization closely related to the institution or under contract as its patent management agent.

Some institutions administer patent applications and the resulting patents directly, utilizing their regular administrative personnel or special units, either within the institutions or separately organized but responsible to their boards of trustees. Others, for legal or fiscal reasons, use the facilities of separately incorporated patent management foundations, independent of but closely allied to them. Still others have entered into agreements with Research Corporation, a non-profit patent management foundation, to handle patentable discoveries in their behalf. Most institutions endeavor to avoid becoming involved in the intricate legal and commercial aspects of patent management, mainly because they lack personnel with the requisite specialized knowledge and experience.

Nearly all the formalized patent policies and many of the generally accepted practices cover all types of research on the campus. Most of the others are concerned mainly with problems growing out of sponsored research projects supported by outside agencies on a contract basis. Certain institutions are unwilling and a few refuse to undertake research projects which entail patentable developments. Others are willing to undertake such projects only when they retain complete control over both the patent rights and the publication of the results of the investigation. Still others will enter into contracts under which the sponsor receives, for a consideration, ownership of all patentable discoveries, as well as full and confidential reports on the research findings.

There is no uniformity in the terms or conditions under which sponsored research is accepted and conducted, nor in the determination of charges. Some institutions have established specific policies for handling such research; others make the best arrangements obtainable in each case. Some will accept only projects which are definitely related to their educational programs and which can be performed by faculty members and students as part of their regular activities. Others have set up special facilities for sponsored research, employing personnel who devote full time to such activities. A number have established special research bureaus or divisions within the institution to relieve the faculty and regular administrative personnel from contractual relations with research sponsors.

It is the usual practice for educational institutions to retain control over the publication of the results of research conducted on the campus. When an investigation is financed through outside funds, that control is frequently but not always exercised subject to prior consent of the sponsor and after a reasonable time, to protect patent applications and the interests of the sponsor in commercial development. A few

institutions which turn over all the results to the sponsor, including publication privileges as well as patent rights, merely reserve approval of any reference to the institution or its part in the investigation. In some instances they proscribe use of the name of the institution in any way.

IV

In order to encourage personal research interests of faculty members and other employees, most educational institutions place little or no restriction on the disposition of inventions and patentable discoveries resulting from scientific research conducted on an individual's own time and at his own expense, even when the institution's facilities and equipment are used. Such inventions are considered to be the exclusive property of the inventor and he retains the full patent rights and complete freedom to dispose of them as he deems proper.

It is the general practice at a number of institutions, particularly smaller colleges, which have had little or no experience with the problem and no urgent occasion as yet to adopt formal patent policies, to allow their faculty personnel the widest freedom in these matters. When the issue has arisen, it has either been decided by mutual agreement or the college has disclaimed any share in royalties or other benefits. Faculty committees and administrative officers have usually ruled in favor of the inventor when any question has been raised as to the institution's having any interest or equity in the discovery.

Institutions with formalized patent policies usually recognize, by explicit reference or by implication in formal policy statements, that an invention or discovery which is not related to the individual's regular teaching or research responsibilities belongs to the inventor, and accordingly waive all claim to a share in possible financial returns. Similarly, at many of the institutions which, in the absence of an established policy, follow generally accepted practices, as well as those which observe a laissez faire or hands-off policy, ownership of patents resulting from personal research rests with the inventor. This is also one of the basic considerations in most of the new policies now being formulated.

At a few institutions a distinction is made between discoveries within the inventor's field of employment and those outside that field. Almost invariably those employed for full-time research in state agricultural and engineering experiment stations and in the special research institutes affiliated with educational institutions are required to sign patent assignment agreements covering all patentable inventions in any way related to their work.

In the absence of established policies some institutions consider each case on its merits, leaving it to the judgment of the faculty member whether he should bring the matter to the attention of the president or designated administrative officer or faculty committee charged with consideration of research and patent problems. A few universities with definite patent policies require that all patentable discoveries,

as well as the intention to apply for patents, be brought to the attention of the administration, either directly or through appropriate committees.

In the administration of formal patent policies a number of institutions have established committees on patents to advise and aid faculty members on matters of patentability, prosecution of the patent application, commercialization of the patent when issued, and general business aspects of patent management. Through these committees and the regular university administrative organizations, and also through the facilities of affiliated patent management foundations where they exist, means are provided whereby, by voluntary assignment of their patent rights, faculty members may be relieved of the burdensome legal and administrative problems associated with the commercial exploitation of patents.

Frequently these committees also have responsibility for determining whether the institution has any interest or equity in the discovery and for defining what action should be taken in line with the prevailing patent policy or accepted practice of the institution. In many instances it is difficult to determine the extent to which incidental or permitted use of equipment and other facilities, membership in the company of scholars assembled on the campus, professional contacts with colleagues and others connected with the institution, and the general atmosphere and surroundings contribute to the evolution of patentable ideas. Certain institutions require reimbursement of whatever contribution in institutional time, money or facilities has been made to the production of a patentable discovery, even though the patent rights remain the sole property of the inventor.

Few patent policies include any reference to patentable discoveries resulting from student research, except where the student is employed or receives specific fellowship aid under an industrial research contract. In general, inventions made by students, including those on academic scholarships and fellowships, are considered to be the private property of the students. The question of requiring students to sign patent assignment agreements is occasionally raised, especially when scholarship aid is involved. In a patent policy recommended some years ago for a midwestern university, research fellows were treated as intermediate between faculty members and students, and it was proposed that any inventions made by a research fellow under any circumstances should be the property of the university.[13] In cases where the student is receiving scholarship aid, the acceptance of such aid is generally not considered as changing the status of the student in regard to title to inventions or developments, since such scholarship funds are provided primarily for the assistance of outstanding students and are in general administered by, rather than controlled by, the institution. The rights of the student include the right to assign or otherwise dispose of his patent rights.

Even where inventions and other developments grow out of research which is entirely or substantially financed by the institution there is considerable variation

[13] RICHARD SPENCER, UNIVERSITY PATENT POLICIES 10 (1939).

in the patent policy observed, the procedures followed, and the recognition of the inventor. However, it is generally the practice to require assignment of title to such inventions and developments, as well as any patent rights that may accrue from them, to the institution or to its designated agent when the research is part of the regular duties and responsibilities of a faculty or staff member. In such cases the institution bears the costs of obtaining the patent and assumes responsibility for its exploitation. Provision is usually made for the patent rights to revert to the inventor if the institution or its designated agent does not file a patent claim within a reasonable time, which is sometimes but not always specified in the assignment agreement.

Exceptions to the general rule are found, for the most part, in those institutions which observe a definite hands-off patent policy and leave all such matters to the discretion of the inventor. In certain of these institutions, however, restrictions are placed on discoveries affecting public or individual health. A few institutions make a distinction between discoveries within the inventor's field of employment and those outside that field, as in the case of personal research conducted on the individual's own time and at his own expense.

Most institutions require full-time research personnel and others employed on special research projects to sign patent assignment agreements covering all patentable ideas and discoveries that may result from their investigations. Such agreements are generally required of full-time research employees in state agricultural and engineering experiment stations, and also of those employed on projects conducted in or under special research institutes affiliated with educational institutions.

A number of institutions have special committees or boards to which are referred patentable discoveries and questions of the institution's interest in them and the desirability of securing patents at the institution's expense. These committees usually also determine what recognition or reward, if any, should be given to the inventor when recommending the specific action to be taken in each case. In many instances the inventor is required or advised to assign his rights to a patent management organization designated by the institution to represent its interest and handle the commercialization and general administration of the patent rights.

V

The war effort lent strong impetus to the long-term expansion of total research and development expenditures in the United States. In the five years from 1941 to 1945 three billion dollars was spent for these purposes, almost all of it going for developmental work on implements of war, with about 83 per cent of the total cost being financed by the Federal Government. Despite these vast expenditures during the war, the Nation's postwar budget for research and development during 1947 will reach the highest point in our history—more than a billion dollars.[14]

Both government and industry have been making increasing demands upon the

[14] SCIENCE AND PUBLIC POLICY, REPORT OF THE PRESIDENT'S SCIENTIFIC RESEARCH BOARD (1947).

personnel and facilities of the universities and technological institutes for assistance in their postwar programs. As a result university research has been receiving added stimulus from these outside sources. The situation, particularly in industrial laboratories, is made more acute by the critical shortage of scientific and technical personnel and difficulties in obtaining construction material and laboratory equipment.

The Federal Government, cognizant of the magnitude of the problem and its relation to the national defense and the public welfare, is launched upon an extensive program and is spending a considerable portion of its research and development budget in the colleges and universities. Industry is also looking to the colleges and universities for assistance in solving its reconversion problems. Unable to provide within their own resources means for producing new ideas for the improvement and replacement of obsolete facilities and processes to meet postwar conditions, large and small businesses alike, as well as trade associations and groups of related industrial firms, are seeking the services of educational institutions in research work on specific developmental problems.

Despite the heavy teaching load resulting from swollen postwar enrollment and their lack of adequate instructional staffs, educational institutions in all parts of the country have been quick to respond to this new call. A number of these institutions have for years been rendering such service to industry, both on an institutional basis and through consulting and research work on the part of individual staff members. This has been particularly true in state universities, land-grant colleges and technological institutes. However, largely as the result of experiences with war contracts and observation of what others have done and are doing, there has been a material increase during the past several years in the number of colleges and universities offering research services to industry.

An appendix in the National Research Council's recently published directory of industrial research laboratories[15] lists approximately three hundred educational institutions which offer such services, and the list is admittedly incomplete. At a number of institutions special research institutes, corporations, and foundations, both independently incorporated and with institutional affiliation, have been established for the conduct and administration of sponsored research programs, as well as for the management of the patentable results of research.

Encouraged by the success, often more apparent than real, of certain of these organizations, more than seventy colleges, universities, and technological institutes have set up agencies, many within the past three years, and others are contemplating similar action. These organizations are located in all parts of the country and at all types of institutions, large and small, public and private—at endowed universities, state universities, land-grant colleges, technological institutes and small colleges alike.

Some are integral parts of the administrative and organic structure of the insti-

[15] INDUSTRIAL RESEARCH LABORATORIES IN THE UNITED STATES 349-355 (8th ed. 1946).

tutions concerned, usually as special research departments or divisions. Others are independent non-profit foundations, separately incorporated but closely affiliated with the educational institutions and utilizing their personnel and facilities. A few maintain special research laboratories and separate personnel who are distinct from the regular teaching staffs of the institutions. Combinations of full-time services of special research workers and part-time research and supervisory services of regular teaching members are found at a number of institutions.

Many of these agencies have been set up to provide convenient means for relieving the institution's regular business and administrative staff of contractual relations with research sponsors and of patent management problems. In some instances they are also concerned with the general development of new sources of financial support for the institution itself. Still others are designed to provide machinery for conducting sponsored research activities, particularly where restrictive statutory provisions make it either impossible or undesirable for the institutions to perform these services themselves. In tax-supported institutions these agencies provide media for keeping the supplemental revenue from sponsored research and patents outside the regular fiscal controls of the institution.

There is a wide diversity in the organization and operation of these agencies and in their handling of the policies and responsibilities of sponsored research programs. As has been previously observed, there is no uniformity in the terms or conditions under which these sponsored research projects are accepted and conducted, nor in the determination of the charges made. The patentable products of such research are handled in many different ways, the ownership and control of patent rights sometimes being retained by the university but more often being turned over to the sponsor under a predetermined contractual arrangement.

VI

An important—and controversial—aspect of the patent problem is concerned with the patentable products of scientific research that affect public and individual health, particularly discoveries and inventions of a medical, pharmaceutical, therapeutic, or hygienic nature. Those universities that have comprehensive patent policies usually include such discoveries, processes, developments, and inventions within the scope of general over-all policies. A few provide specifically for a different treatment of medical discoveries, designed to discourage patenting except when it is considered necessary in the public interest and then without consideration of profit, either to the individual or to the institution. A considerable number have no fixed policy: when cases arise, each one is handled individually, usually without any uniform pattern except, as a general rule, to discourage investigators from seeking patents.

The prevailing practices of educational institutions, especially those with medical faculties, are influenced to a considerable extent by the traditional attitude of the medical profession as to the ethics of patenting medicinals and medical appliances

and by failure to differentiate between patenting for personal gain and patenting in the public interest. Many scientists working in this field also take the position that the results of their research, both patentable and otherwise, should be shared "without fee or stipulation." Such an attitude, however, does not preclude patenting a new process or discovery in the public interest.

Through the centuries medicine has given freely of its discoveries for the benefit of mankind and these discoveries have become the property of all who cared to employ them in the control of disease. However, as medicine has become more complex, involving specialized investigations in the fields of biochemistry, physiology, physics, and associated branches, great numbers of full-time research scientists in the hospital and the laboratory work with members of the medical profession but are not bound by the same ethical principles. Many important medical preparations and techniques have been developed in university laboratories, often at considerable expense to the institutions.

In order to obtain a comprehensive picture of the present situation in educational institutions with regard to the handling of patents in this field, a special study[16] has been made of the practices of the sixty-nine medicals schools on the approved list of the Council on Medical Education and Hospitals of the American Medical Association and of the universities and colleges with which fifty-nine of them are affiliated. It was found that:

Eight of the university-affiliated medical schools have special policies for dealing with medical patents, several of which are applicable on a university-wide basis.

Nine others conform to formalized general university policies for handling all types of patentable results of scientific research.

The other forty-two have no formal or established policy, either in the medical school or in the university at large, although many of the medical schools follow practices which are generally accepted throughout the universities with which they are affiliated.

Only two of the ten independent medical colleges have clearly defined policies; the other eight either follow informal policies or have no policy at all.

The patent question is currently under review at more than half of these medical schools, at a number of them as part of new or revised general university policies. Obviously the patent problem is not a settled one in the medical schools, and a wide difference of opinion exists among their faculty members as to the ethics of patenting a medical discovery; but, in those schools, as in educational institutions generally, the question is being given thoughtful consideration at the present time. Much of the stimulation for the establishment of definitive patent policies stems from problems growing out of research projects sponsored by outside agencies, especially commercial firms. Frequently such practices as are currently followed are concerned solely or mainly with the results of scientific research conducted under grants from these outside sponsors.

[16] As part of the patent policy survey now being made by the National Research Council, to be published early in 1948.

The complexity of the problem and the wide variation of procedure in handling medical discoveries are clearly indicated in the prevailing practices of these fifty-nine approved university medical schools and ten independent medical colleges. The view has been expressed by some scientific investigators that no patents should be taken out for discoveries or inventions in the medical field which may affect individual or public health, and that the control should be left to legislative action. Nevertheless, patenting such discoveries is not considered to be wrong in itself, but to be desirable to control them in the public interest.

VII

Patent management is a complicated business and is expensive. It requires a high degree of legal competence, administrative astuteness, and promotional zeal—a combination of talent not always readily available in an educational institution. The patent search is a specialized technical job. The preparation and processing of patent applications is exacting work for legal counsel. The administration of patent rights demands careful attention to intricate details and constant watch for infringement. The exploitation and disposal of patents, through sale and licensing agreements, require salesmanship of a high order.

It is natural, therefore, that most educational institutions make every effort to avoid becoming directly involved in the intricate legal and commercial aspects of patent management. Some endeavor to accomplish this by adopting a hands-off policy and refusing to handle patents. Others utilize the facilities of separately incorporated patent management foundations, independent of but in some instances closely related to the institution by the terms of their charters and by the membership of trustees, administrative officers, and faculty on their boards of directors.

A few attempt to handle patents as a part of the routine duties of already established administrative units, such as the comptroller's or business office, or through especially designated committees responsible directly to the administration or to the trustees. A number have faculty committees on patents which exist primarily for the purpose of insuring that pertinent institutional regulations are observed; or they may be advisory bodies charged with recommending action on matters that range from the desirability of taking out a patent to the determination of equities.

There are at least three distinct equities or interests involved in patentable discoveries or inventions resulting from scientific research in an educational institution: (1) the inventor or inventors; (2) the institution, and (3) the general public, to which must be added a fourth, the sponsor or supporter of the research, in the case of sponsored research. When further developmental work is necessary, a fifth interest may be involved, although frequently the developer is the same as the sponsor or supporter of the original research.

The recognition and protection of these several and diverse interests naturally complicates any individual situation. Self-interest, personal rights, institutional policies, employer-employee relations, academic freedom, contractual relations, patent law, business practices, commercial competition, and the variables in individual cases are some of the elements that contribute to the problem. Nevertheless, to be equitable and effective a patent policy must provide for such recognition and protection, placing the responsibility where it can be discharged most expeditiously and with the minimum of burden on the regular administrative and teaching staffs of the educational institution.

PATENT COSTS OF MILITARY PROCUREMENT IN WARTIME

RALPH L. CHAPPELL* AND W. HOUSTON KENYON, JR.†

"Our mission," said Robert P. Patterson, then Under Secretary of War, addressing the assembled Army patent staffs in December, 1944, "is to put in the hands of our fighting forces weapons and equipment that will be better than anything the enemy has produced or will produce. We are not fighting this war with weapons of the prior art."[1] These words reveal the underlying reason why patent costs are an inevitable part of the cost of war, because the manufacture of weapons and equipment suited to modern combat is almost certain to involve the use of patented inventions. In wartime military purchasing these costs create an administrative problem, not only to control their reasonableness but to discover where the liability exists and to provide for its existence when unknown.

Patent costs began to be recognized in and following World War I as an appreciable item in the cost of military supply. During that conflict the Army saw the need of patent supervision, and its earliest "patent section" was created late in 1917 in the Signal Corps. Others were created, before the armistice, in the Ordnance Department, Quartermaster and Motor Transportation Corps, and the Chemical Warfare Service. Corresponding and contemporaneous growth occurred in the Navy Department. While these patent staffs sought and negotiated licenses for the Government under certain patents and devoted some time to contract matters, their major task then and throughout the inter-war years was the solicitation of patents for service inventors.

The work of numerous commissions and boards, and of the Court of Claims, during the inter-war years, in determining the liability of the Government for patent infringements committed during World War I, gave clear warning that these liabilities might involve substantial figures in a future conflict.[2] Moreover, the

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[1] *Report of Speeches and Discussions at the Under Secretary of War's Patent Conference,* Aberdeen Proving Ground, Aberdeen, Md. (Dec. 15-16, 1944). This report, which was printed by the War Department for circulation to its patent staffs, will be cited here as "Aberdeen Report."

[2] Portner, Gondos, and Eddy, *The Preliminary Checklist of the War Department Foreign Patent Claims Records* (The National Archives, PC 10 (43-25), Sept., 1943), states that the Commission for Adjustment of Foreign Claims (1924) paid $57,340.10 to settle 27 patent claims (pp. 13-16); that the German-Austrian Claims Unit (1929-1931), acting under authority of the War Claims Act of 1928, 45 STAT. 254, paid $12,485,387.83 to German nationals and $966,487.50 to Austrian and Hungarian nationals to settle 1,069 claims involving about 6,000 patents (pp. 16-22); and that the Commission for

history of such litigation in the Court of Claims indicated that at least a generation might be required to settle them all, at great expense both to the Government and to the litigants.[3]

In World War II, the armed forces were fully aware of the magnitude of the costs and liabilities involved, and maintained substantial staffs to deal with them. The problem was not merely one of negotiation with known patent owners. It consisted mainly in establishing and applying measures to detect accruing patent costs or liabilities, to deal with adverse claims and unreasonable royalty charges, to assemble officer personnel qualified to handle such questions, and to guide them in their work according to a uniform pattern of policy.

Two primary goals were recognized as the objectives of this program: (1) that as far as possible no unsettled patent liabilities should be left behind when the war came to an end, and (2) that unreasonable and excessive patent royalty charges should so far as possible be currently eliminated from the costs of wartime procurement.

The purpose of this paper is to review briefly the efforts of the War and Navy Departments in the years 1941-5 to achieve these two goals, and to discuss some of the problems involved. It is divided into two parts: (1) a discussion of certain problems relating to Government liability for unlicensed infringement, and the policies adopted by the War and Navy Departments in respect thereto; and (2) a discussion of certain problems arising in connection with administration of the Royalty Adjustment Act of 1942, and the policies adopted by the War and Navy Departments in respect thereto. This paper does not undertake to discuss contracting procedure with regard to rights in inventions made by War and Navy Department employees in the course of their employment, or by War and Navy Department contractors in the performance of research and development contracts.

I

PROCUREMENT FROM UNLICENSED SOURCES

Prior to enactment of the Act of June 25, 1910,[4] government suppliers were subject to liability for infringement under the patent laws in the same manner and to the same extent as private suppliers. Damages could be recovered against them and they were subject to injunction at the discretion of the court. The Government itself, however, could not be sued for infringement. Government liability for infringement was therefore involved only in those cases where (1) action could be shown on the part of government officers imposing upon the Government a con-

Adjustment of British Claims (1932-33) paid $255,500. to settle 17 patent claims (pp. 22-25). A survey by one of the authors indicates that the total amount awarded in all judgments of the Court of Claims, entered in patent infringement cases based on War Department procurement during World War I, was $2,862,733.91.

[3] The last patent infringement case in the Court of Claims involving military procurement during World War I was decided December 4, 1944. Thompson v. United States, 102 Ct. Cl. 402, 63 U.S.P.Q. 281 (1944).

[4] 36 STAT. 851, as amended, 35 U. S. C. §68 (1940).

tractual obligation to pay reasonable compensation for the invention used[5] or (2) a special enabling act waived the sovereign's immunity from suit. The Act of June 25, 1910, merely gave the sovereign's general consent to be sued, but did not relieve the supplier of direct liability.[6]

Procurement of military weapons and supplies for use in the Spanish-American War is said to have involved the first use of patent provisions in government purchase contracts. These took the form of what would be called today "counter-indemnity," under which the Government agrees to indemnify the supplier against patent damage claims arising out of his performance of the contract. The practice of using counter-indemnity is said to have fallen into disuse at the close of the Spanish-American War, and not to have been revived until inauguration of the procurement program associated with World War I. During World War I counter-indemnity was extensively used.

Counter-indemnity could not protect the contractor against the issuance of an injunction, nor did the Act of June 25, 1910, do so.[7] The granting of an injunction against a government supplier, particularly in wartime, is a matter of serious concern to the armed forces, since it may hinder or delay the delivery of vitally needed supplies. This jeopardy to national security was pointed out to Congress in a letter dated April 20, 1918, from Franklin D. Roosevelt, then Acting Secretary of the Navy.[8] In response to this letter Congress enacted the Amendment of July 1, 1918,[9] to the Act of 1910 which cut off completely the patentee's remedy against the contractor, both by way of injunction and damages, and substituted in lieu thereof an action against the Government for "reasonable and entire compensation."[10] The 1918 amendment came too late to affect materially the use of counter-indemnity provisions during the few remaining months of World War I, but as the War and Navy Departments resumed normal peacetime purchasing it appears that the use of counter-indemnity was largely dropped.

During the inter-war years 1919-1940, War and Navy Department supplies were purchased upon advertisement and bid in conformity with the requirements of Section 3709 of the Revised Statutes,[11] and upon a form of government contract, applicable to all departments, known as "U. S. Standard Form No. 32." Soon after the armistice, those charged with responsibility for government procurement policy began to consider the advisability of having the Government seek, from its supplier, an "indemnity" provision under which the supplier agrees to hold the Government harmless with respect to liability falling upon it under the Act of 1910 (as amended) for the manufacture or use of the articles which he supplies. A case

[5] *E.g.*, United States v. Bethlehem Steel Co., 258 U. S. 321 (1922).

[6] William Cramp & Sons Ship and Engine Building Co. v. International Curtis Marine Turbine Co., 246 U. S. 28 (1918).

[7] Marconi Wireless Co. v. Simon, 246 U. S. 46 (1918).

[8] Richmond Screw Anchor Co. v. United States, 275 U. S. 331, 342 (1928).

[9] 40 STAT. 705, 35 U. S. C. §68 (1940).

[10] See Richmond Screw Anchor Co. v. United States, 275 U. S. 331 (1928).

[11] REV. STAT. §3709 (1875), 41 U. S. C. §5 (1940).

in point which gave impetus to this movement was that in which the War Department, calling for bids for a number of the well-known Lundin lifeboats (which were the subject of patent claims then pending in the courts), received a low bid from a competitor of the patentee. The War Department, obliged by law to award the contract to the low bidder, insisted that he agree to indemnify the Government. Subsequently, the Government was in fact held liable,[12] was mulcted in damages, and recouped them from the supplier.[13]

The War Department's experience in the lifeboat case prompted an opinion of the Comptroller General on December 21, 1933, in which it was said:

> Where it is known with certainty that patents are involved, bidders may properly be required to show legal right to manufacture thereunder, or the United States may directly obtain such right for its own use or use through its contractors, with provision in the specifications accordingly, but where the matter is doubtful, the interests of the Government should be protected through including in the contract the patent infringement indemnity clause and requiring ample security.[14]

The effect of this ruling was to require contracting officers of the Government to insist upon a patent indemnity clause wherever "the matter is doubtful," and caution soon dictated a widespread and growing insistence upon such provisions in all contracts. Furthermore, the direction of the Comptroller General that there be "ample security" led to the insertion in many contracts of a requirement that the supplier not only indemnify but also furnish a bond. It followed, as a matter of course, that the cost of the premium on such bonds became an element tending to inflate bids.

The Act of July 2, 1940,[15] the First War Powers Act of December 18, 1941,[16] and Executive Order No. 9001 of December 27, 1941,[17] authorized purchases by the War and Navy Departments by negotiated contract, without advertisement and bid. At first this change in procurement method had little effect upon the use of indemnity and counter-indemnity clauses.

The Navy, having a centralized purchasing system which subjected all the terms of major contracts to approval by high-level authority before execution, adopted on December 6, 1941, a policy of requiring indemnity in most of its larger contracts, and of not giving counter-indemnity. The Navy did, however, on occasion give its express authorization and consent to the contractor's use of certain inventions in the performance of the contract, this having the effect of governmental assumption of liability under the Act of 1910 and relieving the contractor of direct liability

[12] Welin Davit & Boat Corp. v. United States, 78 Ct. Cl. 772, 20 U.S.P.Q. 206 (1934).

[13] United States v. Lane Lifeboat Co., 118 F. 2d 793 (C.C.A. 2d 1941).

[14] 13 COMP. GEN. 173, 176 (1933-34). To the same effect are Opinion of Oct. 10, 1934, 14 COMP. GEN. 298 (1934-35), where neither the Government nor the supplier could state specifically what patents were involved; and Opinion of Nov. 22, 1934, 14 COMP. GEN. 406, 407 (1934-35), where the contract called for delivery of one experimental aircraft and the risk on its face was negligible in amount.

[15] 54 STAT. 712, 50 U. S. C. A. App. §1171 (Supp. 1946).

[16] 55 STAT. 839, 50 U. S. C. A. App. §611 (1944).

[17] 50 U. S. C. A. App., note following §611 (Supp. 1946).

therefor. When such action was taken in the absence of an indemnity provision in the contract, it had nearly the same effect as if express counter-indemnity had been provided.

The Army, having a highly decentralized purchasing system in which most contracts were negotiated and executed by contracting officers in branch or field offices, was faced with a problem of formulating and issuing appropriate instructions. On September 16, 1941, the Under Secretary of War promulgated a standard form of contract, known as War Department Contract Form No. 1, to be used in all negotiated and other purchases of the Army. To this form were appended a series of optional contract articles, and instructions for their use. Forms of patent indemnity and counter-indemnity were supplied. Unfortunately, the accompanying instructions were not well suited to guide the rapidly expanding number of contracting officers. These instructions directed the contracting officer that "where patented articles" are purchased he "may desire" to include indemnification, and in that event was directed to use the form provided. The defect in these instructions was that, under pressure of wartime procurement, no contracting officer is likely to know whether the item he buys is or is not "patented." Furthermore, delegation to the contracting officer of unrestricted authority to include or omit indemnification, virtually without supervision over the exercise of his discretion, led to great diversity for want of a consistent policy.

The instructions for the use of counter-indemnity likewise left full discretion to the contracting officer and did not afford control by higher authority over the use of such provisions, which might involve the commitment of unappropriated funds and subject the Government to large and unascertained liabilities.

On June 29, 1944, the War Department established a new policy with regard to indemnity and counter-indemnity, and promulgated general regulations governing the use thereof. In essence this policy was (1) that indemnity should be required to the extent, but only to the extent, that contractors supply to the War Department their regular commercial item,[18] and (2) that counter-indemnity should be given only with the approval of the Director[19] in each particular case,[20] but clauses were supplied for general use giving the Government's authorization and consent to the use of inventions embodied in the articles delivered and inventions whose use in manufacture necessarily resulted from the contractor's compliance with instructions given him by the contracting officer.[21]

The result was to terminate altogether the Army's use of counter-indemnity.

[18] ARMY PROC. REGS. §§1117.3 and 1117.5.

[19] "The Director" was the term used in Army Procurement Regulations to describe the Director, Purchases Division, Headquarters, Army Service Forces. To this officer the Under Secretary of War delegated his power and authority to give, by signature, final approval to any contract which required signature by or on behalf of the Under Secretary. The Director therefore constituted the highest contracting authority in the Army in all cases except where he referred a specific contract to the Under Secretary for personal aproval.

[20] ARMY PROC. REGS. §1118 (3).

[21] ARMY PROC. REGS. §335.6.

In no case was the Director's approval sought after June 29, 1944, for a contract containing such a provision.

As to indemnity, the theory was that contractors should be expected to warrant the freedom of their regular commercial items from patent risk, but should not be expected to do so on items made to military specifications or outside their regular commercial experience. Thus, for example, in the supply of .45-caliber pistols, indemnity would not be required from a company which had never made them in peacetime, but would be required from a regular manufacturer of pistols. Some items, however, could not be classified so simply. These were items known as "hybrid," which were made partly to the supplier's standard specifications and partly to the Government's specifications. An example was a commercial truck, modified according to Ordnance specifications to convert it to a mobile machine shop. The "hybrid" situation was taken care of, contractually, by use of the standard indemnity clause to which were added the words *"excepting however* infringements necessarily resulting from the Contractor's compliance with specifications (unless originating with the Contractor) now or hereafter forming a part of this contract or with specific written instructions given by the contracting officer for the purpose of directing the manner in which the Contractor shall perform this contract."[22]

The difficulty of assuring consistent use of indemnity provisions, in the manner required by the new policy, throughout a vast decentralized purchasing organization, was dealt with in the Army by a system of delegations of authority. The procurement regulations were amended to describe the policy, for the information of all contracting officers and supervising officials. There was delegated to the chief patent officer in the headquarters of each service[23] full authority to apply and administer that policy within his service.[24]

An example of regulations within a service is afforded by the Army's Ordnance Department, which issued instructions to its contracting officers dividing all procurement into two parts, commercial items and Ordnance items. In all purchases of "commercial items" the Ordnance district offices were directed ordinarily to use unconditional indemnification; where, however, the item was "modified by Ordnance specifications to meet Ordnance requirements" the qualified or hybrid indemnification clause was to be used. In purchases of "Ordnance items" hybrid indemnification was to be used wherever the item "may be made by any one of several processes within the Contractor's discretion" or where the item was procured "from a Contractor provided partly or entirely with facilities owned or to be owned by the Government"; in all other purchases of Ordnance items no indemnity was to be sought.[25]

[22] ARMY PROC. REGS. §335.5.

[23] "Service" is here used in reference to the eight major purchasing units of the Army—Air Forces, Ordnance, Signal Corps, Quartermaster, Engineers, Chemical Warfare Service, Medical Corps, and Transportation.

[24] ARMY PROC. REGS. §1118.

[25] Ordnance Procurement Instructions, §59,104.1.

While the foregoing system of delegated administrative powers introduced the danger of non-uniformity between Army services, this danger was faced and accepted because of the need for flexibility. It had proved to be impracticable to educate all of the thousands of contracting officers in the field to observe a wholly consistent pattern in the use or omission of indemnity or hybrid indemnity, or to grasp the differing implications of "authorization and consent" in the presence and absence of indemnity. Nor was it feasible for every contract presenting such questions to be referred to the Director. The scheme adopted was a compromise made necessary by decentralization of Army procurement.

It is too much to hope that the methods of administration just described produced perfect consistency. Some contractors have complained of unnecessary insistence upon indemnity by the armed forces. On the other hand, this insistence in a large number of contracts undoubtedly caused suppliers to exercise caution in using patented inventions without license, and probably had the effect of inducing some suppliers to take licenses where they knew that infringement was involved. The Army and Navy felt justified in thus delegating to their prime contractors the tasks of investigation and license procurement because (1) in most cases these contractors were in a better position than the armed forces to know of the applicable patents, and (2) the patent staffs of the Army and Navy were too small in number, and too lacking in search facilities, to be able to investigate and weigh adequately the patent risks involved in a vast and highly diversified purchasing program. The use of indemnity provisions, while a recurring source of contractor complaint, will probably have the effect of greatly reducing the volume of postwar patent litigation in the Court of Claims.

Certain special problems and situations arising out of the use of indemnity may be mentioned:

1. In a number of situations contractors urged, on renegotiation, that they be allowed to charge as costs a reserve against the infringement liabilities on which they had indemnified the Government. Under the Renegotiation Act the allowability of such a reserve was purely a question of tax law. In as much as the taxing statutes and regulations permit reserves only against known liabilities, accruing within the taxable year, the result was disallowance on renegotiation of all reserves except those accumulated against a known patent. While it is recognized that this may operate unfairly in cases where patent liability is not discovered or established until years after the war, it is not believed to be an adequate ground on which to criticize the use of indemnity provisions by the War and Navy Departments under the policy described above. Congress will always have power to grant relief in meritorious cases.

2. In some situations Government procurement, not covered by indemnification, was found to infringe a particular patent, but the owner thereof had neither called the matter to the Government's attention nor taken any steps indicating his desire to make a claim. Situations of this kind seem to have occurred with some frequency

in the Army's Quartermaster Department. The problem was the old one of whether to let a sleeping dog lie, thereby risking the possibility of prolonged litigation in postwar years and heavy liability falling upon the Government, or to take the initiative in seeking a license. In general the policy was adopted in both the Army and the Navy, where infringement was reasonably clear, the volume of procurement large, and the patent apparently valid, of seeking a license. Almost without exception, in these cases, a license was obtained for the Government. In many instances, such licenses provided freedom from royalty on wartime purchases.

3. In a series of contracts with the War and Navy Departments, all identical in form, signed at various times during the war, it was provided that the signing company, in consideration of the Government's agreement not to seek indemnity from the signer in any contract for the purchase of communication and signalling equipment, granted to the Government a royalty-free license for the duration of the war under all patents of the signer relating to such equipment. Approximately 165 such contracts were entered into. Virtually the entire electronics industry signed without compensation. So widespread was the execution of these contracts that problems of patent liability in the field of electronics were largely wiped out, except for claims originating outside the ranks of electronics suppliers. The primary effect was to remove electronic procurement from within the framework of the heavy royalty schedules which for many years had blanketed that industry. At peak wartime procurement, it has been estimated, these royalties would have cost the Government substantially more than thirty million dollars per year.

4. A similar proposal was suggested to the Navy and the Air Forces by the principal suppliers of aircraft and components. Since the final negotiations were concluded in 1945, the agreements were retroactive in nature and involved a waiver, by the Government, of its rights of indemnification against the signer, in return for his waiver of patent damage claims against the Government, covering all procurement of aircraft and components from September 8, 1939, to the end of the war, without money payment in either direction. While two of the principal aircraft supply concerns refused to join in these agreements, substantially the whole of the remainder of the industry did, and on this basis the transaction as a whole was accepted by the Secretaries of War and Navy. Since much Government aircraft procurement, from the beginning of the war, involved broad indemnification, even on military types of planes, the primary effect of the transaction was an exchange of releases between members of the industry. The Government, however, benefited in so far as non-indemnified procurement was concerned.

II

ADJUSTMENT OF ROYALTIES

A significant out-of-pocket cost item in armed forces procurement was royalty payments under patent license agreements, privately entered into between patent owners and government contractors or subcontractors. Ordinarily the royalty pro-

visions of a contract of this kind provide for payment in terms of a percentage of the licensee's selling price, or so much per unit made or processed by the licensee. Under such contracts the unprecedented increase in armed forces procurement, early in the war, caused an unprecedented increase in royalty payments to certain patentees. In most instances the royalty rates or amounts had been privately negotiated before the war in arm's-length dealing, in the setting and prospects of peacetime production, and without contemplation of the huge volume of production which the war brought about and which, had it been foreseen, would probably have led to express provision for reduced rates on the higher increments of such production. As applied to wartime production the rates or amounts of royalty specified in some of these contracts produced annual payments that appeared to be unreasonable and excessive. The following table sets forth eight examples revealed by investigations of the War and Navy Departments during the war:

TABLE 1

CASES ILLUSTRATIVE OF WARTIME EXPANSION OF ROYALTIES

PATENTED ARTICLE OR PROCESS INVOLVED	ANNUAL ROYALTIES UNDER THE LICENSE	
	1938	*1943*
Rotary wing aircraft and parts	$20,000.	$12,000,000.
Turn and bank indicators	10,150.	2,201,175.*
Radio tube sockets and electrical connectors	16,000.	2,000,000.
Reduction gears, dynamic dampers, low-speed superchargers and torque meters	33,800.	4,200,000.**
Propellers	18,216.	2,126,442.
Stop nuts	15,521.	1,213,421.
De-icers	14,067.	972,200.
Aviation training apparatus	50,626.	2,400,000.

* In 1942.
** In 1944.

Successive statutes enacted in the spring of 1942, calculated to prevent price inflation[26] and excessive profits,[27] failed to reach all cases of excessive royalties. Thus the armed forces were confronted with the practical situation that, in purchases of a patented device from an unlicensed source, the patentee would be able to recover "reasonable and entire compensation" from the Government under the Act of 1910; but in purchases thereof from a licensed source, the royalties became a charge against the Government without regard to their reasonableness in rate or total amount, and without opportunity for the Government to question the validity of the patent even though the Government could show it to be invalid. Thus the

[26] 56 STAT. 23 (1942), 50 U. S. C. App. §901 *et seq.* (Supp. 1946).
[27] 56 STAT. 245 (1942), 50 U. S. C. App. §1191 (Supp. 1946).

armed forces were faced with the dilemma of paying exorbitant royalties or foregoing production of critical war items at certain licensed plants.

These considerations, presented to Congress by the armed forces and other departments of Government, led to the enactment on October 31, 1942, of what came to be known as the Royalty Adjustment Act.[28] In brief, this Act provides that when the head of a department believes the royalties on any item he is purchasing are unreasonable or excessive, he is authorized to give notice of that fact to the licensor and licensee. After giving the parties opportunity to be heard, the head of the department is authorized, by order, to fix and specify "such rates or amounts of royalties, if any, as he shall determine are fair and just, taking into account the conditions of wartime production." The issuance of notice has the effect of requiring the stoppage of further royalty payments. The making of an order has the effect of authorizing the licensee to pay royalties to the licensor at the rates or amounts fixed in the order, and no more. As to the excess, all rights of action of the licensor against the licensee are forever cut off; in lieu thereof the licensor is given a right of action against the Government for the recovery of "such sum, if any, as when added to the royalties fixed and specified in such order, shall constitute fair and just compensation . . . taking into account the conditions of wartime production." In such an action there is reserved to the United States the right to challenge the validity of the patent.

A further provision of the statute authorized the head of such department to enter into an agreement with the licensor, provided no suit had been filed against the United States, in full settlement and compromise of the liability incurred by an order issued under the Act.

The scheme of the Act warrants comparison with corresponding legislation in Great Britain.[29] There are two important differences. The American statute does not directly affect the existing private contract, but modifies the remedies available to the licensor for non-payment of royalties; the British statute provides that private licenses shall be altogether inoperative so far as concerns manufacture for or sale to the Government. The American statute is temporary wartime legislation; the British statute is permanent and applies in peacetime as well as in war.

The War and Navy Departments construed the Royalty Adjustment Act as a direction from Congress that, within the limits of administrative expediency, the entire field of royalty payments chargeable to these departments should be surveyed and regulated, rather than that action should be confined to these few known cases where royalties had expanded excessively. Consistently with that view the

[28] 56 STAT. 1013, 35 U. S. C. A. §§89-96 (Supp. 1946).

[29] Section 29 of the (British) Patents and Designs Act, 1907, as amended by §8 of the Patents and Designs Act, 1919 (effective April 23, 1920), provides in part as follows: "A patent shall have to all intents the like effect as against His Majesty the King as it has against a subject. . . . And the terms of any agreement or licence concluded between the inventor or patentee and any person other than a Government department, shall be inoperative so far as concerns the making, use or exercise of the invention for the service of the Crown. . . ." 9 & 10 Geo. V, c. 80.

departments promulgated standards for determining reasonable royalties, and took steps to bring to light all royalty costs involved in their purchases.

A basic principle of administration, in the two departments, was that every effort should be made to deal with excessive royalties by negotiation and agreement, rather than by order. Excessive royalties had in fact been eliminated by voluntary agreement in a few instances before the statute was enacted, and the War and Navy Departments believed that passage of the Act would not diminish the number of individuals and corporations who did not wish to profit excessively from the war. In this they were not mistaken, as the figures given below clearly show. In the War Department insistence upon procedure by negotiation took the form of published regulations, binding upon all delegates,[30] that before issuing notice they should afford the licensor a fair opportunity to effect a voluntary adjustment.[31] No delegate had power to waive this requirement except in emergency cases upon express authority specially obtained from the Director.[32] In the Navy Department a like policy was applied by its Royalty Revision Board.

The negotiation procedure followed by the Royalty Adjustment Board, Army Air Forces, was described as follows by a member of that board, addressing a gathering of delegates from other Army services:[33]

> At the outset of the conference express appreciation to the persons attending and briefly explain the purposes of the Act, stressing the policy of affording the licensor an opportunity to tell his story and that the ultimate aim is to amicably adjust the matter. It is well to state that no definite conclusion has been reached as to whether the royalties are fair and reasonable in view of wartime production. It is also well to emphasize that the royalty rate may be fair and reasonable, based on peace time standards, but that the Act is primarily concerned with whether the dollar amount is fair and reasonable in view of the tremendous increase in wartime production over which no one has control and the limits of which depend upon our enemies.
>
> A graph showing the increase in airplane production over peace time procurement has been used very effectively by the Army Air Forces. It is well to explain that the Royalty Adjustment Act is only a part of the overall legislation designed to prevent inflation and prevent anyone from unduly benefiting from the war. It can be pointed out that it would be obviously unfair to renegotiate the manufacturer who is producing the patented article and limit his profits without, at the same time, curtailing the profits made by the licensor based on the same procurement. The whole atmosphere of the conference should be one of informality and conducted as business men discussing a problem around the table. Obvious grouping of the representatives of the licensor and licensee should be avoided.

[30] Decentralization of Army procurement necessitated delegation of the power of the Secretary of War under the Royalty Adjustment Act to issue notice, to hold a hearing, to make an order, and to execute contracts in settlement and compromise. However, no order became effective as the act of the Secretary of War until signed by the Director. The subordinate powers were delegated to various officers and royalty adjustment boards in each of the services. Those holding such powers are referred to here, and in the Army regulations, as "delegates."

[31] ARMY PROC. REGS. §1112.13. "The policy of the War Department is . . . that, so far as practicable, each licensor shall, where such royalties are believed to be unreasonable or excessive, be given fair opportunity to effect a voluntary adjustment thereof before notice is given."

[32] ARMY PROC. REGS. §1112.4(4).

[33] *Aberdeen Report*, pp. 49-50.

The spokesman for the licensor should be afforded every opportunity to tell his story. Interruptions should be avoided as much as possible and under no circumstances should the conference develop into personalities, or the delegate or his representatives assume the role of a prosecutor. Under no circumstances is there an excuse for discourtesy. The visitor should not be given the impression of being hurried or cut short. Many times his story may involve immaterial and irrelevant matters but remember that what he is discussing may represent hours and days of effort and it naturally means a great deal to him.

. . .

After the licensor or his representative has had ample opportunity to tell his story, pertinent questions may be asked designed to bring out additional facts but not to embarrass the other party. It is surprising how uniform the story becomes, but a successful negotiator can never afford to lose his perspective and become impatient. It is a new experience to the teller and he probably has spent much time in preparation.

. . .

In a second conference the delegate, or his representative, should be in position to carry the initiative. He will have had an opportunity to appraise the invention, analyze the statements made by the licensor, and have reached some determination as to what might be a fair and reasonable royalty as a settlement figure. The same courteous treatment should pervade the conference but the negotiator can take a more positive position as to what he would recommend to the delegate as a basis of settlement. Appearances of trading should be eliminated as far as possible and if the licensor, or his representative, has a counter proposal, the negotiator can always agree to submit the same to the delegate for final acceptance or refusal without materially changing his position.

If the parties are so far apart that no settlement can be made, then the licensor should be promptly notified and a Notice promply issued.

In the administration of the Act a number of problems were encountered, of which some are briefly mentioned below:

1. Since the royalties payable under a single license, or under a series of licenses granted under the same patent, were often chargeable to more than one service of the Army, or to an Army service and to the Navy, it became necessary at an early date to provide for extensive inter-service and inter-departmental cooperation. To this end, the Director set up and maintained a master index of all cases under investigation by the Army. In order to prevent duplicating action by different Army services, Army regulations were issued requiring a delegate who had discovered the existence of substantial royalties, before interrogating the licensor in detail or seeking justification as to the rates or amounts, to report the case to the Director and obtain from him "clearance" to proceed. The effect of clearance was to vest in the delegate exclusive jurisdiction (so far as concerned the War Department) to investigate, settle, give notice, hold a hearing, and recommend the making of an order with respect to the particular royalties involved.[34] With this mechanism of supervision at his disposal, the Director was in a position to insure that Army delegates would move in unison with the Navy Royalty Revision Board in cases involving a joint Army-Navy interest. Coordination between the two departments took the

[34] ARMY PROC. REGS. §§1112.14 and 1112.16.

form of joint negotiations, joint hearings, and settlement agreements signed jointly on behalf of the Secretaries of War and Navy. While the Act required each department to issue its own notices and orders, coordination between Army and Navy representatives was maintained to such an extent that in virtually every case of joint Army-Navy interest where negotiation failed and mandatory action became necessary, notices were issued approximately contemporaneously, and orders were made in identical terms, by the two departments.

The resulting relationship between Army delegates and the Navy Royalty Revision Board and its advisors was so close that in applying standards of fair and reasonable royalties the two departments adopted policies which were substantially identical. The following paragraphs refer to the policy and procedure of both the War and Navy Departments except where the contrary is expressly stated.

2. Where the annual amount of royalties payable under a license in a wartime year greatly exceeded the amount paid in peacetime years, it was ordinarily concluded that the case warranted investigation. Where the increase was very striking, as for example in the cases indicated in Table 1, action was taken to effect an adjustment. On the other hand, cases appeared in which the use of the inventions had been steadily growing, and the royalty income increasing from year to year, during peacetime. In this situation the policy was to regard as excessive only those amounts by which the royalties in war years exceeded the normal growth expectancy.

3. Some cases involved annual royalty receipts approximately the same in wartime as in peacetime, but a shift had occurred in the end-use of the licensed invention from a predominantly civilian to a predominantly military character. In such cases there was no policy that such royalties should be exempt from adjustment merely because there was no increase from a typical peacetime year to a typical wartime year. The portion chargeable to the Government was evaluated as to its reasonableness, standing alone; it was believed that the armed forces should not undertake to allow compensation for the loss of civilian markets. Also, where royalty clauses in a series of licenses provided for declining rates as the volume of business of each licensee increased, the position was taken that the armed forces were entitled to view their total procurement as coming within the rate bracket applicable thereto, as if there were but a single license. Furthermore, in a few cases where annual royalties had not increased in wartime, downward adjustment of royalties was made because validity of the patent was seriously in question, or because expiration of senior patents had removed significant elements of value from the license base. In one case, of the last-named type, where the sole surviving patent in a high-rate license covered a minor detail that was clearly anticipated, an order for zero royalties was made.

4. In a number of cases it was discovered that the license was entered into between a licensor and a war contractor (licensee) during the war at a time when the

parties must have contemplated that substantially the entire royalty burden would be passed on to the Government, or between a licensor and licensee having such close business, personal, or family relationships as to warrant the conclusion that the royalties agreed upon were not the result of arm's-length dealing. In cases of this type the policy was adopted of making an independent appraisal of the value of the patent rights involved, in much the same way as if the United States had been asked to take a license on the terms set forth. The practice was to regard as unreasonable all royalties in excess of those which the Government would have been willing to pay, on the volume of production involved, in direct negotiation with the licensor.

5. Except in cases where there was an absence of arm's-length dealing, or where the expiration of senior patents had removed significant elements of value from the license base, it was the practice during negotiations prior to the giving of notice to assume the validity of the patent. Where, however, it proved impossible to adjust excessive royalties by agreement and it became necessary to issue a notice under the Act, the policy was to make inquiry with regard to the validity and scope of the licensed patent, and to take into account, in fixing fair and just compensation, the findings in regard thereto. Even in such cases, however, it was the practice to limit the use of zero-royalty orders (on grounds of patent invalidity) to those cases where a prior patent or printed publication, or indisputable evidence of prior use, was available to support the conclusion of invalidity as a matter of direct anticipation.

6. In some cases, involving a substantial increase of annual royalties in wartime as compared with prior peacetime years, it was pointed out by the licensor that the Government's probable future disposal of surplus stocks would have the effect of saturating the postwar civilian market with the patented devices, and reducing the patentee's royalty expectancy in years immediately following the war. This situation tended to appear in cases involving royalties on fire-fighting equipment, machine tools, and other apparatus of long life which was bought in large quantities during the war, would be expected to have a long postwar life, and was likely to find its way through the machinery of surplus disposal into civilian hands after the war. In situations of this kind it was the policy of the two departments to take into consideration, in the licensor's favor, anticipated diminution of his post-war royalty income. In a few cases of this kind the factor mentioned was held to justify considerably higher wartime royalties than might otherwise have been approved.

7. In a few cases it was found that excessive and unreasonable royalties were being charged to the departments under a private agreement which, in terms, transferred to the war contractor the entire ownership of the patent, leaving in the grantor no title or ownership whatsoever except the right to receive royalties. Most of these cases, as it happened, were of the type mentioned in paragraph 4 above—*i.e.*, the private agreement was entered into with the expectation that the royalty burden would be passed on to the Government, and there was a lack of arm's-length deal-

ing. The departments determined that such transactions, even though literally sales and not licenses, were, when they produced unreasonable or excessive royalties, the kind of agreements which it was the purpose and intent of the Act to reach. Accordingly, mandatory orders were made in at least two such cases. While the administrative construction thus placed upon the Act is believed to be a sound one, and fully justified by its legislative history, it would no doubt be well, in drafting similar legislation for a future emergency, to provide expressly for the adjustment of excessive royalties arising in connection with a sale of the patent, as well as in licenses.

8. In a considerable number of cases it was found that the licensee had agreed to pay a percentage on sales or a fixed sum per unit (sometimes labeled "royalties" or "engineering fees," or not specifically entitled or described) in consideration of the licensor's both granting a license to use an invention and undertaking to supply engineering services or assistance to the licensee. Sometimes such assistance consisted merely of furnishing drawings at the inception of the contract without subsequent assistance; sometimes engineering supervision and assistance was to continue throughout the term of the contract. The two departments took the position that, while the Royalty Adjustment Act gave authority to adjust that part of the agreed payment which was made in consideration of the grant of a license to use an invention, it did not authorize the adjustment of fees paid solely for technical information or engineering services. In dealing with cases of this kind, the War and Navy Departments adopted the policy of making a preliminary administrative determination as to the value of the technical information or engineering services actually rendered. When this value had been deducted from the total payments due under the agreement, the balance was considered to be royalties for the use of the invention. This policy was based upon the belief that the effect of the statute upon that portion of the payments attributable to a license for the use of an invention could not be avoided or defeated by reason of the fact that such royalties were intermingled with payments for something else. In one or two cases of this type the contract itself afforded means of severance; in others it became necessary to make the administrative determination referred to above.

9. A somewhat similar question arose in connection with leases of patented machinery, where the stipulated consideration was a rental or royalty based upon the extent of use. Most contracts of this kind were found to be drawn in the form of a patent license, authorizing use of a particular machine for a particular purpose, upon a royalty of so much per item produced or processed. Usually there were many hundreds of such licenses outstanding under a particular patent or group of patents. In these situations the War and Navy Departments took the position that the payments specified in the contract covered not only royalty for the use of the invention, but also rental for the use of the machine, since in most cases the risks and burdens of ownership were retained by the licensor. Thus, these cases were,

in effect, dealt with in a manner similar to those mentioned in paragraph 8, above. An administrative determination was first made as to the fair rental value of the machines, apart from the value of license rights under the patents thereon. The residue of the specified payments was then deemed to be royalties for the use of inventions, and was examined for reasonableness in accordance with the requirements of the statute.

10. A few licenses were found to contain price-fixing provisions. Where purchases by the armed forces from the licensee at prices below those specified in the license were, by the terms of the instrument, unlicensed sales, the War and Navy Departments took the view that no royalty payments under the license would be reimbursed to the licensee and the Government would treat the procurement as unlicensed and as giving to the patentee his normal rights under the Act of 1910. Where, however, Governmental purchases from the licensee were licensed even though his sales were in breach of a price-maintenance agreement, the policy was adopted by the War Department (the Navy Department had no such cases) that the price-fixing provisions would be regarded, in part at least, as a benefit flowing to the licensee under the agreement which was not availed of by the Government. Consequently, it was concluded that a part of the royalty payment was attributable to this benefit, and an administrative determination was made allocating part of the royalties to the benefit stated. This part was treated as a non-reimbursable cost item. The balance was treated as royalty for the use of the invention, and examined for reasonableness under the statute.

11. Late in the war the question arose whether, in fixing a reasonable rate or amount for future wartime years, there should be taken into consideration the amount of royalties which the licensor had actually received in prior wartime years before the royalties were discovered. Favoring this procedure was the statutory obligation resting upon department heads to specify royalties which should be fair and just taking into account the conditions of wartime production, which arguably included the entire span of wartime years. Opposed to this procedure, however, was the fact that some licensors (but not all) were subject to renegotiation under the Renegotiation Act for the prior wartime year in which they had received royalties, and these royalty receipts were subject to renegotiation. The question was settled, in the War and Navy Departments, by adoption of the policy that, if a licensor's royalty receipts for a prior year were subject to the Renegotiation Act, these receipts would not be regarded as having been excessive for the prior year in question, and the reasonableness of future rates or amounts would be determined without regard to what had been received in the past. However, the findings made in prior renegotiation proceedings were not to be taken as binding in determining the reasonableness of royalties to be received in the future.[35] This policy was made necessary by the fact that renegotiation did not apply to all licensors. It produced

[35] ARMY PROC. REGS. §1112.11(2) as amended April 5, 1945.

the result, consequently, that the reasonableness of future wartime royalties, in those cases where licensors were not subject to renegotiation, was determined in the light of, and taking into account, the amounts actually received in past wartime years.

12. The interests of the licensor in a considerable number of license agreements were found to have been vested, on behalf of the United States, by the Alien Property Custodian. Consequently, the Custodian was the recipient of royalties accruing on war production, and in several such cases the War and Navy Departments considered these royalties to be excessive. The two departments took the position initially that the Custodian should waive such royalties altogether. The Custodian replied that some of these licenses had been vested from nationals of enemy countries, whereas others had been vested from nationals of countries occupied by the enemy. As to the former, he agreed that royalties would be waived. As to the latter, he pointed out that he was a trustee of the patents and licenses which he had vested, and that he hesitated to enter into any agreement for the reduction of royalties payable thereunder. When efforts to settle by negotiation proved fruitless in cases of the latter kind, the War and Navy Departments were compelled to proceed therein by notice and order. A considerable percentage of the orders ultimately made by the Secretaries of War and Navy were against the Alien Property Custodian as trustee for nationals of enemy-occupied countries. It should be noted that the statute authorizing the Custodian to return seized patents to such aliens expressly provides that the alien shall be bound by any notice or order, with respect to the returned patents, issued under the Royalty Adjustment Act, and shall acquire with the returned patents all rights assertable by a licensor against the United States pursuant to Section 2 of the Act.[36]

13. Where the licensee's product made under the license was sold (often through ordinary trade channels) in part to war contractors and in part to manufacturers supplying the civilian economy, the question was presented what part of the total royalty payments were chargeable to the War and Navy Departments. This situation was involved in almost every case where the licensee was a subcontractor. Usually a fairly accurate estimate could be made, based on sales records of the licensee, allocations of the War Production Board, and military requirement forecasts, showing the percentage of total royalties which would be chargeable to the armed forces. In negotiated settlements the two departments and the licensors were uniformly successful in finding a percentage or formula mutually regarded as fair. In cases where it was clear that a substantial or very large part of the total royalties was chargeable to the armed forces, and failure of negotiation made it necessary to proceed by notice and order, the two departments left it to the licensor to submit his own evidence of segregation in any future litigation arising under the order.

14. In working out the terms of settlements and orders, the two departments sought where possible to cause the benefits of royalty reduction to inure to the Gov-

[36] 60 STAT. 50, 50 U. S. C. A. App. §32(c) (Supp. 1946).

ernment in the form of a reduction in price, rather than in the form of a refund by the licensee or the licensor. This objective could not, however, always be conveniently or effectively achieved, especially in cases where the licensee was a remote subcontractor, or where there were many licensees at the same or different levels in the supply ladder, or where there were so many licensees that supervision would be costly and ineffective. In entering into settlements in such cases the licensor was permitted in several instances to collect in full from his licensees and agreed to pay over to the Treasury, forthwith upon receipt, the amounts determined to be excessive. In making orders in such cases, however, the uniform practice (where price reduction was not feasible) was to require the licensee to refund to the Government the portion of the royalties found to be excessive.

During the period beginning October 31, 1942 (when the Royalty Adjustment Act became law), and ending June 30, 1945, the War and Navy Departments entered into 541 agreements adjusting royalties believed to be excessive, without the giving of notice or the commencement of formal proceedings. During the same period the Government issued 117 notices, all but about a half dozen by the War and Navy Departments. In a substantial number of cases notices were issued contemporaneously by both the War and Navy Departments to the same licensor in respect of the same license or set of licenses. As of June 30, 1945, these 117 notices had resulted in five cases closed without adjustment upon a finding that the royalties were in fact fair and reasonable, twenty settlement agreements adjusting the royalties, and forty-two orders. The remainder, 50 notices, were outstanding cases not disposed of on June 30, 1945. Of the forty-two orders mentioned, six had been converted into settlement agreements on or before June 30, 1945, leaving thirty-six orders outstanding on that date. So far as is known, only four of these orders were made by departments other than the War and Navy Departments.

In each royalty adjustment case, the Army delegate handling the matter was required to supply an estimate, based on the facts before him, as to the amount of royalty costs saved to the Government by the action taken under the Act, whether by agreement or order. For this purpose future procurement was estimated in accordance with existing military supply schedules to the end of 1945. Similar estimates were prepared by the Navy Royalty Revision Board. The total estimated savings effected by the War and Navy Departments, compiled from these sources, had reached the impressive total of $500,000,000 by June 30, 1945. Of this amount $17,087,580 was represented by outstanding orders. The sum last-named is, of course, contingent, because it is subject to reduction by such amounts as may be recovered in the Court of Claims. The balance, over $475,000,000, represents patent royalty costs estimated to have been saved to the Government without possibility of offsetting recoveries, through War and Navy Department administration of the Royalty Adjustment Act.[37]

[37] The figures set forth in the text are taken from a letter (and annexed exhibits), dated June 5, 1946, addressed to the Hon. H. M. Kilgore, Chairman, Subcommittee on War Mobilization, U. S. Senate,

The magnitude of the figures involved amply demonstrates the need for the Royalty Adjustment Act, and the high percentage (both numerically and dollar-wise) of adjustments effected by agreement indicates the wisdom of a policy which placed a premium upon settlement by negotiation and limited the use of mandatory powers to a minority of the cases involved. On the other hand, it is no doubt true that the methods of determining reasonableness were, to some extent, hit-or-miss. Under pressure of the war it was not feasible to make the detailed study of patent validity and scope which private parties make under peacetime conditions before entering upon extensive financial commitments. Rules of thumb, to some extent, took the place of exhaustive search and analysis. It is too much to hope that logical and perfect results were reached in all cases. Nevertheless, the achievement of a group of officers, many of them comparatively inexperienced in patent negotiation of such magnitude, in saving nearly half a billion dollars in patent costs is an operation which deserves its modest share of credit alongside the more extensive operations of re-pricing, cost analysis, renegotiation, and other legal instruments by which the armed forces undertook to exclude unreasonable profits from the costs of war.

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and signed by John Kenney, Acting Secretary of the Navy, and Robert P. Patterson, Secretary of War. A copy of this letter, with annexed exhibits, was filed as a supplement to the Brief for the United States on Reargument, in Alma Motor Co. v. The Timken-Detroit Axle Co. (United States of America, Intervenor), No. 11, October Term, 1946, in the Supreme Court of the United States (329 U. S. 129 (1946)).

THE CONTROL OF PATENT RIGHTS RESULTING FROM FEDERAL RESEARCH

DAVID LLOYD KREEGER*

A golden stream of patentable inventions pours from the scientific research and development conducted or financed by the Federal Government. Some of the discoveries resulting from these activities pass under Government ownership or control, equivalent in current practice to public dedication of the particular device or process. The greater part of these technological riches, however, embodied in patents and patent applications, flows into the coffers of private industry, subject only to a nonexclusive license in the Government, and is available for commercial use, exploitation, or suppression according to the interests of the owner.

The question of what disposition of patent rights from Federal research will best serve the public interest is one that has been pondered and mooted in all branches of Government during the past fifty years,[1] the numerous studies having culminated in an exhaustive investigation recently completed by the Department of Justice.[2] On the basis of that study, the Attorney General submitted a comprehensive report to the President in May, 1947, recommending that as a basic policy all technology financed with Federal funds should be owned or controlled by the Government.[3]

The formulation of a sound policy for publicly financed inventions acquires special urgency from the dominant role assumed by the Federal Government during the last decade in the field of scientific inquiry. Before World War II, private industry financed about two-thirds of the Nation's research, estimated to involve some $300,000,000 in 1938, with Government and institutional research accounting for about $50,000,000 each. But within six years the positions were reversed, and by July 1, 1944, the Government was financing more than three-fourths of all research in this country, spending over $900,000,000—including $200,000,000 for research in the field of atomic energy—and utilizing the services of at least 20,000 Government

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[1] U. S. DEP'T JUSTICE, REPORT AND RECOMMENDATIONS OF THE ATTORNEY GENERAL TO THE PRESIDENT, INVESTIGATION OF GOVERNMENT PATENT PRACTICES AND POLICIES 163-314 (1947) (hereinafter cited as REP. ATT'Y GEN.) summarizes all the prior studies in the field since the turn of the century.

[2] 1 REP. ATT'Y GEN. 1, 10-12.

[3] 1 *id.* at 2-8.

scientists and technicians, and more than 15,000 other civilian employees.[4] Moreover, the indications are that the Government will continue to account for the lion's share of research in the post-war period. The Federal research budget for the fiscal year ending June 30, 1947, was again $700,000,000, exclusive of the amount allotted to atomic energy research,[5] and a proposed long-term program of Federal aid to scientific research received nearly unanimous endorsement in 1945 and 1946.[6] Indeed, the solution of many important technological problems currently confronting our civilization requires the pooling of facilities on a vast scale, involving expenditures which the Federal treasury is better suited to finance than private enterprise, particularly in the field of basic research where the profit return is highly conjectural.[7]

I

THE GOVERNMENT AS PATENT OWNER

The United States may acquire and exercise patent rights in the same way as any private corporation. The arid controversy as to whether acquisition of a patent by the Government would "merge" and extinguish the rights[8] is rendered academic by the decisions which expressly or inferentially recognize the power of the Federal Government to receive a patent assignment,[9] the several acts of Congress authorizing the acquisition and licensing of patents by the Government in specified circumstances,[10] and the well established administrative practice of licensing Federally

[4] U. S. NAT. RESOURCES COMMITTEE, RESEARCH—A NATIONAL RESOURCE, Pt. 1, 72-74 (1938); Pt. 2, 19-39 (1940); THE GOVERNMENT'S WARTIME RESEARCH AND DEVELOPMENT, 1940-44, REPORT NO. 5 OF THE SUBCOMMITTEE ON WAR MOBILIZATION TO SENATE COMMITTEE ON MILITARY AFFAIRS, Pt. 1, 79th Cong., 1st Sess. vii, 278-326 and *passim* (1945); Pt. 2, 3-8 (1945); INDUSTRIAL RESEARCH AND CHANGING TECHNOLOGY, W. P. A. NAT. RESEARCH PROJECT (Jan. 1940).

[5] 92 Cong. Rec. 8265 (July 2, 1946); BUREAU OF BUDGET, TABULATION OF FUNDS AVAILABLE FOR RESEARCH AND DEVELOPMENT FOR FISCAL YEAR 1947 (Oct. 24, 1946).

[6] President Truman's Message to Congress, Sept. 6, 1945, H. R. Doc. No. 282, 79th Cong., 1st Sess. 20-21 (1945); *Hearings before the Subcommittee on War Mobilization of Senate Committee on Military Affairs on S. 1297 and related bills*, 79th Cong., 2d Sess. (1946); SEN. REP. No. 1136, 79th Cong., 2d Sess. (1946); 92 CONG. REC. 8146 *ff.* (1946); *Hearings before the Subcommittee of House Committee on Interstate and Foreign Commerce on H. R. 6448*, 79th Cong., 2d Sess. (1946); Shapley, *Status Quo or Pioneer*, 191 HARPERS 314 *ff.* (Oct. 1945).

[7] See *The Great Science Debate*, Fortune, June, 1946, p. 116.

[8] Ewing, *Government Owned Patents*, 10 J. PAT. OFF. SOC'Y 149 (1928), and Wille, *Government Ownership of Patents*, 12 FORD. L. REV. 105 (1943), suggest that no enforceable patent rights would remain in the Government because of a kind of "merger"; a contrary view is expressed by Kwai, *Patents to Government Employees*, 13 J. PAT. OFF. SOC'Y 387 (1931); Broder, *Government Ownership of Patents*, 18 *id.* at 697 (1936); and NAT. PAT. PLANNING COMM'N, GOVERNMENT OWNED PATENTS AND INVENTIONS OF GOVERNMENT EMPLOYEES AND CONTRACTORS 9 (Second Report, 1944). Compare also HERBERT A. HOWELL, COPYRIGHT LAW 40 n. (1942).

[9] United States v. Dubilier Condenser Corp., 289 U. S. 178, 193, 206 (1933); Solomons v. United States, 137 U. S. 342, 346 (1890); Houghton v. United States, 23 F. 2d 386, 390-391 (C. C. A. 4th 1928), *cert. denied*, 277 U. S. 592 (1928); *cf.* James v. Campbell, 104 U. S. 356, 358 (1881). A statement to the contrary in the majority opinion in United States v. Dubilier Condenser Corp., *supra*, was deleted on motion of the Solicitor General, 289 U. S. 706. See also the uniform rulings of the Attorney General that the Government may receive an assignment of patents from its employees: 37 OPS. ATT'Y GEN. 180, 185 (1933); 31 *id.* 463 (1919); 32 *id.* 321 (1920); 34 *id.* 320 (1924); 37 *id.* 180 (1933); 38 *id.* 425, 534 (1936); 39 *id.* 164 (1938).

[10] Synthetic Liquid Fuels Act of 1944, 58 STAT. 191 (1944), 30 U. S. C. §323 (Supp. 1946); Tennessee Valley Act of 1933, 48 STAT. 61 (1933), 16 U. S. C. §831d (i) (1940); Fortifications Appropriation Act of July 6, 1916, 39 STAT. 348, amending REV. STAT. §4894 (1875), 35 U. S. C. §37 (1940); Joint Resolution of June 3, 1864, 13 STAT. 588; Act of June 19, 1878, 20 STAT. 583.

owned patents.[11] According to a line of rulings by the Attorney General going back almost thirty years, the several Federal departments and agencies, even without express statutory authorization, may issue revocable, nontransferable, and nonexclusive licenses, with or without royalty.[12] And as a practical matter, the Government may open its inventions to the public at will, either by publishing them without seeking a patent,[13] or by issuing a free license to anyone who desires it.[14]

II

THE INVENTIONS OF FEDERAL EMPLOYEES

A. Applicable Legal Principles

Under general principles of law, an employer may acquire an interest in the inventions made by his employee within the scope of employment, ranging from a free nonexclusive license to full ownership of the patent rights, and the United States as an employer is entitled to these prerogatives of the employment relationship.[15] Hence, as employer, the Government is entitled to equitable ownership of an invention made by a Federal employee within the scope of his employment if he was engaged or assigned to accomplish that result,[16] or, to state the criterion in the

[11] See *Hearings before House Patents Committee on H. R. 12412*, 69th Cong., 1st Sess. 1 (1926); REPORT OF INTERDEPARTMENTAL PATENTS BOARD, SEN. DOC. No. 83, 68th Cong., 1st Sess. 1 (1923); *Hearings before Senate Patents Committee on S. 2303 and S. 2491*, 77th Cong., 2d Sess. 1208 *ff.* (1942); Wille, *loc. cit. supra*, note 8, at 106.

[12] 38 OPS. ATT'Y GEN. 425, 427, 534 (1936); 34 *id.* 320, 328, 329 (1924); 31 *id.* 463, 466 (1919); 39 *id.* 164 (1938); 37 *id.* 180 (1933). Congressional sanction is, however, necessary for an exclusive or irrevocable license or an outright assignment of a patent. 31 *id.* 463 (1919); 34 *id.* 320 (1924); 38 *id.* 534 (1936). The Surplus Property Act of 1944, 58 STAT. 765, 774, 775 (1944), 50 U. S. C. App. §§1628(a), 1629, authorizes the sale of "surplus" patents and inventions, and the Trading with the Enemy Act, 40 STAT. 411 (1917), as amended, 50 U. S. C. App. §§5, 6, 616 (Supp. 1946), authorized the sale of patent rights seized by the Alien Property Custodian during World War I. See United States v. Chemical Foundation, 272 U. S. 1 (1926).

[13] No patent can issue on an invention published more than one year prior to filing a patent application thereon. REV. STAT. §4886 (1875), 35 U. S. C. §31 (1940).

[14] While the Attorney General has denied the power of the executive to issue irrevocable licenses without statutory authorization, see note 12, *supra*, public dedication of Government-owned patents has been practiced by several departments and agencies for many years. See 2 REP. ATT'Y GEN. 25 (Department of Agriculture); 2 *id.* 83, 106 (Bureau of Standards); 2 *id.* 199-200 (Interior Department); 2 *id.* 479, 483 (War Department); 2 *id.* 311-312 (Navy Department). The Synthetic Liquid Fuels Act of 1944, *supra*, note 10, expressly authorizes public dedication of a certain class of Government-owned inventions. A public register of Government-owned patent rights is now maintained in the Patent Office pursuant to Exec. Order No. 9424, 9 FED. REG. 1959 (1944).

[15] Solomons v. United States, *supra*, note 9, at 342; United States v. Burns, 12 Wall. 246, 252 (1870); Gill v. United States, 160 U. S. 426, 435 (1896); United States v. Dubilier Condenser Corp., *supra*, note 9, at 192; Houghton v. United States, *supra*, note 9, at 388; Shearer v. United States, 87 Ct. Cl. 40, 79 (1938). Compare the dissenting opinion of Justice Stone in the *Dubilier* case, *supra*, at 217-218, suggesting that Government service may create equities in the employer which are absent from private employment.

[16] Solomons v. United States, *supra*, note 9, cited and followed in Gill v. United States, *supra*, note 15, at 432, 435 (a case involving Government employment), and Standard Parts v. Peck, 264 U. S. 52 (1924) (private employment). In a similar case, the Supreme Court stated, *obiter*, that the Government would be entitled to ownership of an invention made by an employee who was "specially employed to make experiments with a view to suggest improvements." United States v. Burns, *supra* note 15. Compare McAleer v. United States, 150 U. S. 424, 430 (1893). Hapgood v. Hewitt, 119 U. S. 226 (1886), and Dalzell v. Dueber Mfg. Co., 149 U. S. 315 (1893), held that a private employer was entitled to the invention only if there was an express agreement to that effect, but the scope of these decisions was limited by the *Dubilier* case, *supra*, note 9, at 187, which cited them for the proposition that the employer is not entitled to inventions made in the course of general employment.

language of the most recent case, if his duties "contemplated invention" of that general type.[17]

This rule has been criticized as too "mechanical" by the late Chief Justice (then Associate Justice) Stone, who suggested that the governing principle should be "whether the employee may in equity and good conscience, retain the benefits of the patent," taking into account the public interest in the functions from which the inventions were evolved.[18]

The rule that the employer becomes entitled to patents only if the inventor was "employed to invent" does not mean that he must originally have been hired to invent; it is enough that the duties to which he was assigned at the time contemplated the making of such an invention.[19]

Where the employee is entitled to ownership of his invention, the Government may obtain a common law "shop-right" therein whenever there is some contribution by the employer to the conception, development, or perfection of the invention or to its "reduction to practice," a contribution which may take the form of the use of the employer's materials, appliances, facilities, or equipment, or the aid of services of other employees, or may consist merely of the fact that the invention was made or perfected during the inventor's compensated working hours.[20] The shop-right is,

[17] United States v. Dubilier Condenser Corp., *supra,* note 9, at 193-196. Mr. Justice Stone, dissenting in that case, restated the rule adopted by the majority of the court as follows: "Wherever the employee's duties involve the exercise of inventive powers, the employer is entitled to an assignment of the patent on any invention made in the scope of the general employment." *Id.* at 211-212.

The Fourth Circuit Court of Appeals defined the rule in somewhat different terms: If an employee "be set to experimenting with the view of making an invention," the discoveries made by him in the course of the experiments belong to the employer. Houghton v. United States, *supra,* note 9, at 390.

[18] Dissenting opinion of Justice Stone in United States v. Dubilier Condenser Corp., *supra,* note 9, at 214-219. The dissenting opinion, in which Justice Cardozo concurred and with which Chief Justice Hughes generally agreed, held that the Government should obtain title to inventions made by employees who, although "not engaged to invent, in the sense in which a carpenter is employed to build a chest, . . . were employed to conduct scientific investigations in a laboratory devoted principally to applied rather than pure science with full knowledge and expectation of all concerned that their investigations might normally lead, as they did, to invention." *Id.* at 211-212. In these circumstances, Justice Stone thought that the Government should have been awarded the patents under either the majority rule or under his definition of the applicable principles. *Id.* at 211-212, 217-218.

[19] Houghton v. United States, *supra,* note 9, at 390; Goodyear Tire & Rubber Co. v. Miller, 22 F. 2d 353 (C. C. A. 9th 1927); *cf.* Magnetic Mfg. Co. v. Dings Magnetic Separator Co., 16 F. 2d 739 (C. C. A. 7th 1926); Johnson Furnace & Eng. Co. v. Western Furnace Co., 178 Fed. 819, 823 (C. C. A. 8th 1910). The only unreversed decision to the contrary is Texas Co. v. Gulf Refining Co., 13 F. 2d 873 (S. D. Tex. 1926), restricting the rule to original employment to invent.

In his dissenting opinion in the *Dubilier* case, Justice Stone pointed out that the majority had rejected "the distinction between specific employment or assignment and general employment to invent" (289 U. S. at 213). This distinction was threafter adopted by a state court in State Board of Education v. Bourne, 7 So. 2d 838 (Fla. 1942); *but cf.* State v. Neal, 12 So. 2d 590 (Fla. 1943).

[20] United States v. Dubilier Condenser Corp., *supra,* note 9, at 188-192; Gill v. United States, *supra,* note 15, at 433; United States v. Houghton, *supra,* note 9, at 388; Kelton v. United States, 32 Ct. Cl. 314 (1897); Shearer v. United States, *supra,* note 15; Knapp v. United States, 46 Ct. Cl. 601, 631 (1911).

In the earlier cases, the shop-right was thought to be based upon principles of equitable estoppel, so that in addition to the employer's contribution, express or implied consent by the employee to the employer's use of the invention was deemed essential. McClurg v. Kingsland, 1 How. 202 (1823); Hapgood v. Hewitt, *supra,* note 16; Solomons v. United States, *supra,* note 9, at 346; Lane & Bodley Co. v. Locke, 150 U. S. 193 (1893); Gill v. United States, *supra,* note 15, at 430. The more recent cases ignore the factor of acquiescence. See the *Dubilier* and *Houghton* cases, *supra.*

in effect, a royalty-free, nonexclusive, irrevocable, nontransferable license to make, use and sell the invention and its products.[21]

Even where the Government has no rights under common law principles in an invention made by an employee, it may have what amounts to a free license because of its sovereign immunity from suit. Prior to 1910 a patent owner seeking compensation from the Government for the unlicensed use of his invention had to establish a contract by the United States to pay for such use.[22] If the circumstances did not permit the inference of an agreement (for example, if the Government mistakenly asserted a supposed shop-right),[23] the sole avenue of redress against the United States was by special act of Congress.[24] By the Act of June 25, 1910,[25] as amended on July 1, 1918,[26] patent owners were given the right to sue the United States in the Court of Claims for "reasonable and entire compensation" for the use of their inventions "without license" or "lawful right" by Government employees or contractors.[27] This is the exclusive remedy, and no infringement suits may be brought against the Federal employee or contractor who makes or uses the patented invention.[28]

However, the Act of 1910 is by its own terms inapplicable to inventions made or owned by a Government employee.[29] Thus the Act leaves the Government's shop-right in effect wherever it would arise under common law principles,[30] and at

[21] Flannery Bolt Co. v. Flannery, 86 F. 2d 43 (C. C. A. 3d 1936); *cf.* Curtiss Aeroplane & Motor Corp. v. United Aircraft Eng. Corp., 266 Fed. 71, 77 (C. C. A. 2d 1920); Imperial Supply Co. v. Grand Trunk Ry., 11 East L. R. 340 (Can. 1912); see Note, 16 A. L. R. 1210 (1922). It may also authorize a contractor to make the patented article for the holder of the shop-right. Schmidt v. Central Foundry Co., 218 Fed. 466 (D. N. J. 1914), *aff'd* on other grounds, 229 Fed. 157 (C. C. A. 3d 1916).

[22] United States v. Burns, *supra,* note 15; United States v. Palmer, 128 U. S. 262, 272 (1888); Hollister v. Benedict Mfg. Co., 113 U. S. 59, 67 (1885); James v. Campbell, *supra,* note 9, at 359; Eager v. United States, 35 Ct. Cl. 556 (1900); see Crozier v. Krupp, 224 U. S. 290, 304 (1912); *cf.* Kelton v. United States, *supra,* note 20, at 349.

[23] Knapp v. United States, *supra,* note 20, at 640; Davis v. United States, 23 Ct. Cl. 329 (1888); see Cramp & Sons v. Curtis Marine Turbine Co., 246 U. S. 28, 40 (1918).

[24] Schillinger v. United States, 155 U. S. 163 (1894); United States v. Berdan Co., 156 U. S. 552 (1895); Belknap v. Schild, 161 U. S. 10, 17 (1896).

[25] 36 STAT. 851.

[26] 40 STAT. 705. As so amended, the Act of 1910 appears at 35 U. S. C. §68 (1940).

[27] After the Court of Appeals for the District of Columbia issued an injunction against infringement of a patent by an Army officer (Krupp v. Crozier, 32 App. D. C. 1 (1908)), the Act of 1910 was passed and the injunction dissolved. Crozier v. Krupp, *supra,* note 22, at 305. This Act was held not to protect a Government contractor against an infringement suit (Cramp & Sons v. Curtis Marine Turbine Co., *supra,* note 23), and the statute was broadened to remedy this defect. See Richmond Screw Anchor Co. v. United States, 275 U. S. 331 (1928).

[28] Crozier v. Krupp, *supra,* note 22; Richmond Screw Anchor Co. v. United States, *supra,* note 27.

[29] A proviso in the Act states: "The benefits of the provisions of this section shall not inure to any patentee, who, when he makes such claim, is in the employment or service of the Government of the United States, or the assignee of any such patentee," nor shall this Act "apply to any device discovered or invented by such employee during the time of his employment or service." See 35 U. S. C. §68 (1940). This provision was the result of a fear that the employee by virtue of his position might be able to induce the Government to use his invention rather than some competing device, and a belief that Government service may have "educated" the inventor to make his invention. See 45 CONG. REC. 8758, 8767, 8769, 8772-74, 8782-85 (1910).

[30] United States v. Dubilier Condenser Corp., *supra,* note 9, at 205-219; H. R. Doc. No. 1288, 61st Cong., 2d Sess. 3-4 (1910), 45 CONG. REC. 8757 (1910).

the same time it preserves the Government's immunity from suits for the use of patented inventions made by a Federal employee even if the Government has no shop-right.[31] Indeed the immunity applies to inventions made *prior* to Federal employment, if the inventor is a Government employee when the claim of infringement is made.[32] The practical effect is to give the Government "limited licenses . . . in the nature of shop-rights" under the inventions of all Government employees, regardless of the circumstances in which they were made,[33] and the sole remedy for the use of such inventions is a special act of Congress.[34]

The Act of 1910, giving a judicial remedy to patent owners for the Government's unlicensed use of their inventions, thereby immunized Federal employees and contractors against personal liability for such use.[35] While the Act denied the remedy where the inventions were owned or made by a Federal employee, the employee or the contractor who used the invention in behalf of the Government would seem to be equally immune from personal liability. For in order to give effect to the Government's immunity from suits upon Federal employees' inventions—an immunity which Congress expressly preserved after considerable debate—it must extend to the Government's agents and contractors. One of the dominant purposes of the Act was to preclude interference with Federal functions through patent infringement suits against Government employees or contractors.[36] This purpose, as well as the Government's immunity under its employees' patents, would be nullified if the Government's agent or contractor were subject to personal liability or to injunction suits on account of the use of a Federal employee's inventions.[37] Hence,

[31] Moore v. United States, 249 U. S. 487 (1919); National Electric Signaling Co. v. United States, 60 Ct. Cl. 338, 340-343 (1925); see 45 CONG. REC. 8758, 8783-8785 (1910).

[32] See note 29, *supra*. This aspect of the proviso was apparently intended to guard against the possible use of official position to induce the Government's adoption of inventions for the advantage of the employee. See 45 CONG. REC. 8785 (1910).

[33] United States v. Dubilier Condenser Corp., 59 F. 2d 381, 382 (C. C. A. 3d 1932), affirmed without reference to this statement 289 U. S. 178 (1933). This may prevent the making of an enforceable agreement by the Government to pay for the use of such inventions. See 14 COMP. GEN. 396 (1934); Vulcanite Cement Co. v. United States, 74 Ct. Cl. 692, 705 (1931); *cf.* National Electric Signaling Co. v. United States, *supra*, note 31.

[34] See 45 CONG. REC. 8785 (1910). This remedy was successfully invoked in several instances, sometimes resulting in special appropriations of compensation for the Government's use of the invention. 45 STAT. 1349, 1381, enacted after findings by the Court of Claims pursuant to a Congressional reference, see SEN. DOC. No. 134, 69th Cong., 1st Sess. (1926); 49 STAT. 2077, see 2 REP. ATT'Y GEN. 280-281. On other occasions, the special acts granted jurisdiction to the courts or otherwise waived the employee's disability under the 1910 Act. Gates v. United States, 87 Ct. Cl. 358 (1938); Shearer v. United States, *supra*, note 15; same case, 101 Ct. Cl. 196 (1944); National Electric Signaling Co. v. United States, *supra*, note 31; same case, 76 Ct. Cl. 545, 571 (1933); Van Meter v. United States, 47 F. 2d 192, 195 (C. C. A. 2d 1931). Special jurisdictional acts were sometimes enacted prior to the 1910 statute. See Dahlgren v. United States, 16 Ct. Cl. 30 (1880); Talbert v. United States, 25 Ct. Cl. 141 (1890).

[35] See cases cited note 28, *supra*.

[36] See 45 CONG. REC. 8776 (1910); Crozier v. Krupp, *supra*, note 22; Richmond Screw Anchor Co. v. United States, *supra*, note 27.

[37] See 45 CONG. REC. 8772 (1910); *cf.* Yearsley v. Ross Construction Co., 309 U. S. 18, 20-22 (1940). To hold that the Federal employee may sue the Government officer or contractor who uses his patented invention would give the Federal employee greater rights (injunction, accounting and treble damages under REV. STAT. §§4919, 4921 (1875), 35 U. S. C. §§67, 70 (1940) than the private patent owner, who is entitled only to "reasonable and entire compensation" under the Act of 1910.

apart from the usual difficulties attending injunction and damage suits against Federal agents,[38] the Act would seem to bar them on account of the use of an invention of a Government employee.

Apart from the Act of 1910, the Government may acquire a free license under an employee's invention if he elects to patent it without fee under the Act of 1883 as amended,[39] but this statute does not alter such rights as the Government may have to an even greater interest in the invention.[40]

Like any private employer, the Government may by contract or regulation increase its rights in inventions made by its employees. The courts will enforce agreements between private employers and their employees, requiring an outright assignment of all rights to inventions made by the latter in the course of their employment,[41] and similar contracts may validly be made by a Government agency.[42] Such agreements may be entered into at the outset of employment or after employ-

[38] Prior to the Act of 1910, the Supreme Court declined to enjoin the infringing *use* of a patented article by a Government officer, holding that the suit was in effect one against the United States. Belknap v. Schild, 161 U. S. 10, 24-25 (1896), apparently overruling the contrary dictum in Cammeyer v. Newton, 94 U. S. 225, 234-235 (1876). In James v. Campbell, 104 U. S. 356, 359 (1881), the court expressed great doubt whether a patent infringement suit could be maintained against a public officer "who acts only for and in behalf of the Government." See also Hollister v. Benedict Mfg. Co., *supra,* note 22; but *cf.* Cramp & Sons v. Curtis Marine Turbine Co., *supra,* note 23, at 40-41.

The lower courts have generally denied injunctions and other relief, on grounds of public policy, against the manufacture of infringing articles. Dashiell v. Grosvenor, 66 Fed. 334 (C. C. A. 4th 1895), *aff'd* on other grounds, 162 U. S. 425 (1896); Firth Sterling Steel Co. v. Bethlehem Steel Co., 216 Fed. 755, 762 (E. D. Penn. 1914); Marconi Wireless Telegraph Co. v. Simon, 227 Fed. 906 (S. D. N. Y. 1915), *aff'd,* 231 Fed. 1021 (C. C. A. 2d 1916), reversed on other grounds 246 U. S. 46 (1918); Foundation Co. v. Underpinning & Foundation Co., 256 Fed. 374, 376 (S. D. N. Y. 1919). But compare Krupp v. Crozier, 32 App. D. C. 1 (1908), reversed after enactment of the 1910 Act, Crozier v. Krupp, 224 U. S. 290 (1912); Moffet v. Fiske, 51 F. 2d 868 (App. D. C. 1931), reversing, on the ground of a Government shop-right, a judgment for damages against a Navy officer on account of infringement of another officer's patent.

[39] Act of March 3, 1883, 22 STAT. 625, c. 143, as amended by the Act of April 30, 1928, 45 STAT. 467 (1928), 35 U. S. C. §45 (1940). Prior to the 1928 amendment, the lower Federal Courts held that a patent issued to an employee without fee under the 1883 Act was open to free public use as well as Governmental use. Squier v. American Tel. & Tel. Co., 21 F. 2d 747 (S. D. N. Y. 1924), *aff'd* on other grounds 7 F. 2d 831 (C. C. A. 2d 1925); Selden Co. v. National Aniline & Chemical Co., 48 F. 2d 270 (W. D. N. Y. 1930); Hazeltine Corp. v. A. H. Grebe & Co., 21 F. 2d 643 (E. D. N. Y. 1927); Hazeltine Corp. v. Electric Service Eng. Corp., 18 F. 2d 662 (S. D. N. Y. 1926). The 1928 amendment made it clear that the patents issued thereunder would be subject only to a free Government license, leaving the commercial rights in the employee. See United States v. Dubilier Condenser Corp., *supra,* note 9, at 201-203, 220-221.

[40] See United States v. Houghton, *supra,* note 9, 20 F. 2d at 437; 39 OPS. ATT'Y GEN. 402, 406-407 (1936); 37 *id.* 180, 184 (1933).

[41] Guth v. Minnesota Mining & Manufacturing Co., 72 F. 2d 385, 389 (C. C. A. 7th 1934), *cert. denied,* 294 U. S. 711 (1935); Goodyear Tire & Rubber Co. v. Miller, *supra,* note 19, at 355; Conway v. White, 9 F. 2d 863 (C. C. A. 2d 1925); see Hapgood v. Hewitt and Dalzell v. Dueber Mfg. Co., both *supra,* note 16; *cf.* Littlefield v. Perry, 21 Wall. 205, 226 (1874). The agreements may not be unreasonably broad, as by covering inventions completely unrelated to the employer's business and made after leaving employment. Guth v. Minnesota Mining & Mfg. Co., *supra.* The available remedies include specific performance. Wage v. Safe Cabinet Co., 249 Fed. 696 (C. C. A. 6th 1918); Guth v. Minnesota Mining & Mfg. Co., *supra.*

[42] McAleer v. United States, 150 U. S. 424 (1893); United States v. Houghton, 20 F. 2d 434, 438, 439 (D. Md. 1927), *aff'd,* 23 F. 2d 386 (C. C. A. 4th 1928), *cert. denied,* 277 U. S. 592 (1928).

Reference to such agreements on the part of Government agencies will be found in 77 CONG. REC. 2626 (1933); 2 REP. ATT'Y GEN. 434, 436-7 (War Department); 2 *id.* at 387 (TVA).

ment has begun, and will be effective in respect of inventions post-dating the agreement.[43] The agreements will usually supersede such disposition as the common law would otherwise make of the invention, with one possible exception. While the Government may unquestionably contract for greater rights in its employees' inventions than it would otherwise acquire, an agreement to accept *lesser* rights may constitute a waiver of a governmental interest or a disposition of public property requiring statutory authorization.[44]

The distribution of rights as between the Government and its employees in the latter's inventions is subject to considerable control by administrative regulation, which, as a condition of appointment or of continued employment, can require the employee to assign to the United States (or to dedicate to the public) all rights to inventions made within the scope of employment.[45] Congress has in fact impliedly approved a 1942 regulation of the Interior Department calling for the assignment of inventions made by its research employees in the course of duty, or made with a substantial contribution by the Government in the form of facilities, time, information, or the like.[46] And for almost half a century, several Government agencies have had administrative regulations prescribing the respective rights of the Govern-

[43] Goodyear Tire & Rubber Co. v. Miller, *supra,* note 19, at 355; Mississippi Glass Co. v. Franzen, 143 Fed. 501 (C. C. A. 3d 1906). An employee may agree to give the private employer lesser rights, such as a license. *Cf.* Hildreth v. Duff, 143 Fed. 139 (C. C. W. D. Pa. 1906).

[44] See Houghton v. United States, *supra,* note 9, at 391. It has been suggested that such an agreement may also violate REV. STAT. §1765 (1875), 5 U. S. C. §70 (1940), prohibiting payment of extra compensation to a Government employee whose salary is fixed by law or regulation. See 2 REP. ATT'Y GEN. 187 (1947). And there may be a lack of consideration. *Cf.* Vulcanite Cement Co. v. United States, *supra,* note 33.

[45] Selden Co. v. National Aniline & Chem. Co., 48 F. 2d 270 (W. D. N. Y. 1930), gave "the effect of law" to a regulation of the Department of Agriculture requiring public dedication of patented inventions "connected with the work of the Department" and made by an employee "through the expenditure of Government time and Government money." In 1906 a Congressional Committee commended this regulation to all Federal agencies for adoption. See H. R. Doc. No. 8147, 59th Cong., 2d Sess. 12 (1907). In United States v. Dubilier Condenser Corp., *supra,* note 9, the question of the administrative power to prescribe the respective rights in inventions of an employee was reserved as unnecessary to the decision (289 U. S. at 208). The dictum in that opinion, that "administrative officers" have "no power to declare" any policy as to the reciprocal rights of Government and employee in the latter's inventions, plainly refers to a declaration of rights *after* an invention has been made, and not to an antecedent regulation generally applicable to the department. This seems plain from other portions of the opinion (289 U. S. at 187-189, 192) recognizing the validity of a contract which fixes the respective patent rights of employer and employee, and citing McAleer v. United States, 150 U. S. 424 (1893), which enforced such a contract.

[46] At the hearings on the Synthetic Liquid Fuels Act of 1944, Congress was apprised by the Secretary of the Interior of his 1942 regulation requiring employees of the Department to assign to the Government all inventions made within the general scope of their "governmental duties." *Hearings before a Subcommittee of the Senate Committee on Public Lands and Surveys on S. 1243,* 78th Cong., 1st Sess. 5-6, 9 (1943). After discussion of this regulation, 90 CONG. REC. 1708 (1944), Congress provided in the Act that patents acquired by the Secretary of the Interior thereunder shall be open to free public use. 58 STAT. 191 (1944), 30 U. S. C. §§323, 324 (Supp. 1946); 89 CONG. REC. 9316 (1943); 90 *id.* 3209. This provision, enacted with notice of the departmental regulation and predicated upon the assumption that the Secretary would require an assignment of all inventions made by departmental employees under the Act, constitutes a form of Congressional ratification of the regulation itself. *Cf.* Biddle v. Commissioner of Internal Revenue, 302 U. S. 573 (1938); Inland Waterways v. Young, 309 U. S. 517, 525 (1940).

ment and the employees in the latter's inventions.[47] These regulations, and their consistent administrative application for so many years, add strength to the view that they fall within the departmental rule-making powers.[48] Since the Tennessee Valley Authority (which is entitled by statute to ownership of all inventions made by its employees)[49] is apparently the only Federal agency engaged in scientific research whose patent policy is now governed by Congress, all other agencies of the Government are free to adopt such patent policy as they deem proper.[50]

Where the Government becomes entitled to ownership of the invention, it may enforce its rights by compelling an assignment of the patent or the application by the employee.[51] This remedy must in fact be pursued if the benefits of the invention are to be extended to the public, since the Government's equitable ownership cannot be invoked by private persons as a defense to an infringement suit.[52]

B. Current Patent Practice

The patent practices of the several Government agencies in regard to inventions made by technical and professional employees engaged in scientific research and experimentation—the source of the great bulk of inventions produced by Federal employees—may be grouped generally into two categories.

1. Some agencies (notably Interior, Agriculture, the Bureau of Standards, and the Office of Scientific Research and Development during World War II) require an assignment of title to inventions made in the course of employment, if they bear a close relationship to the employee's functions, or if they involve a substantial Governmental contribution in the form of materials, facilities, equipment, services of

[47] See 2 REP. ATT'Y GEN. 7-8 (1947) (Agriculture); 2 *id.* at 83, 98, 117-118 (Bureau of Standards and Weather Bureau); 2 *id.* at 183-185 (Interior); 2 *id.* at 327-328 (OSRD); 2 *id.* at 498-499 (WPB); 2 *id.* 426-427 (War); 2 *id.* 260-261 (Navy); 2 *id.* at 148 (Public Health Service).

[48] United States v. Jackson, 280 U. S. 183, 193 (1930); United States v. Johnston, 124 U. S. 236, 253 (1888). Besides the generally implied powers of each Federal agency to run its own affairs (United States v. McDaniel, 7 Pet. 1, 14 (1833)), the head of each department has long had the power "to prescribe regulations, not inconsistent with law, for the government of his department, the conduct of its officers and clerks. . . ." REV. STAT. §161 (1875), 5 U. S. C. §22 (1940). This authority was designed to promote efficiency and integrity in the discharge of official duties. *Ex parte* Curtis, 106 U. S. 371 (1882); *cf.* United States v. George, 228 U. S. 14 (1913). Unless plainly and palpably "inconsistent with law," administrative regulations issued under this statute will be respected by the courts and given the full force and effect of law. Caha v. United States, 152 U. S. 211, 221 (1894); *Ex parte* Reed, 100 U. S. 13 (1879); Boske v. Comingore, 177 U. S. 459 (1900).

[49] The Tennessee Valley Act of 1933, 48 STAT. 61 (1933), 16 U. S. C. §831d(i) (1940) provides that inventions made "by virtue of or incidental to" service by a TVA employee, "together with any patents which may be granted thereon, shall be the sole and exclusive property" of TVA, which may license them and pay the inventor such portion of the income therefrom "as it may deem proper." For the background of this provision, see 77 CONG. REC. 2626-29 (1933).

[50] The regulations authorized by REV. STAT. §161 may take the form of either a formal, written regulation, or of general administrative practice. United States v. Birdsall, 233 U. S. 223 (1914); United States v. McDaniel, 7 Pet. 1, 14 (1833); Haas v. Henkel, 216 U. S. 462 (1910); see Benson v. Henkel, 198 U. S. 1 (1905).

[51] Houghton v. United States, *supra,* note 9.

[52] Yablick v. Protecto Safety Corp., 21 F. 2d 885 (C. C. A. 3d 1927); Hazeltine Corp. v. Electric Service Eng. Corp., *supra,* note 39; Dubilier Condenser Corp. v. Radio Corp. of America, 34 F. 2d 450 (D. Del. 1929).

other employees, or information not generally available.[53] The practice of these agencies is in accord with that of virtually all laboratories operated by private industry,[54] by private research organizations,[55] and by the principal foreign governments,[56] which in general require inventions made by research workers to be assigned to the employer.[57]

2. The other Government agencies having a defined patent policy purport to apply the common-law principles governing the employee-employer relationship, but differ in the application of those principles. Only one—the Public Health Service—has to any appreciable extent called for an assignment of title;[58] the others, although ostensibly enforcing the same policy, leave the patent to the employee in almost all cases and reserve only a free license to the Government.[59]

Wherever an agency (in either category) does not claim title to the employee's invention, it usually calls for a nonexclusive, royalty-free license to the Government.[60] A few agencies apparently require a license only in circumstances where a common-law shop-right would arise in any event;[61] others seem to demand a license regard-

[53] The Department of the Interior, by a 1942 regulation, calls for the assignment of inventions made by employees within the general scope of their duties, or with a substantial use of Government facilities, a fact to be administratively determined; in other cases the employee retains title subject to a Government license. 2 REP. ATT'Y GEN. 183-185. The War Production Board issued a similar regulation in January, 1944. 2 *id.* at 498-499. The Department of Agriculture for many years required assignment or public dedication of inventions relating to the Department's work or involving use of its facilities, in other cases taking a free license. Since the Dubilier decision in 1933, *supra,* note 9, the Department takes title only to inventions made within the employee's "specifically assigned duties," as administratively determined, but its actual application of this criterion has resulted in the assignment of the great majority of employees' patents. 2 *id.* at 13-14. The Weather Bureau follows Agriculture's policy. 2 *id.* at 117-120. The following have required an assignment of inventions made in the course of the employee's official duties: Bureau of Standards, 2 *id.* at 99; Food and Drug Administration, 2 *id.* at 152-153; Office of Scientific Research and Development in respect of its full time technical staff, 2 *id.* at 327-328; Signal Corps of War Department during World War II, 2 *id.* at 434-435; National Academy of Sciences and National Research Council, 2 *id.* at 223; American Printing House for the Blind, 2 *id.* at 154-155; and Aeronautics Branch of Department of Commerce until its transfer to the Civil Aeronautics Authority, 2 *id.* 123-127.

[54] 3 REP. ATT'Y GEN. 62-65.

[55] 3 *id.* at 53-54, 73.

[56] 3 *id.* at 84 (Canada); 3 *id.* at 107-198 (Great Britain); 3 *id.* at 110 (France); 3 *id.* at 111-113 (pre-Nazi Germany); 3 *id.* at 115-116 (prewar Japan).

[57] This is also the practice in about half of the educational institutions in the United States. 3 *id.* at 55.

[58] 2 REP. ATT'Y GEN. 148-149.

[59] War Department (except Signal Corps, see note 53 *supra*) 2 REP. ATT'Y GEN. 427-428; Navy Department, 2 *id.* at 259-266; National Advisory Committee for Aeronautics, 2 *id.* at 229-230; Public Roads Administration and Public Buildings Administration, 2 *id.* at 160-162; Civil Aeronautics Authority, 2 *id.* at 126-127; and Bureau of Census, 2 *id.* at 111-112.

[60] Such a license is usually Government-wide. 2 REP. ATT'Y GEN. 12-13, 111, 117-118, 126, 184-185, 272-273, 441-443. Prior to World War I, some agencies limited their licenses to the particular agency or bureau, a practice criticized by a Congressional Committee in 1907. 2 *id.* at 6, 116-117. The written licenses obtained by the War and Navy Departments permit use of the invention "by or for" the Government, a statutory phrase which covers use by Government contractors as well as employees. See note 27, *supra.* Even without such a provision, a license to the Government would probably protect contractors, under the analogy to a common law shop-right. See note 21, *supra.*

[61] Interior Department, 2 REP. ATT'Y GEN. 176; Public Health Service, *id.* at 148; Public Roads Administration, *id.* at 160. The War Department apparently restricts its licenses to inventions made in the course of official work, *id.* at 426.

less of the circumstances.[62] The Government's immunity from suit on an employee's patent tends to give such a license a limited significance, principally as an argument against relief by special Act of Congress.[63]

The diversity of patent policy throughout the Government may in part be attributable to the lack of clarity of the common-law rules governing the disposition of patent rights. Prior to 1933 the rules were frequently restated in varying terms,[64] and even when the Supreme Court purported to settle the matter in the *Dubilier* case, it divided six to three as to the application of the majority's rule to the facts at hand.[65] But the principal explanation of the fact that an identical formula, adopted by three agencies (Agriculture, War, and Navy),[66] has resulted in Government ownership of most inventions made in Agriculture,[67] and employee ownership of virtually all inventions in the War and Navy Departments,[68] lies in a difference of opinion as to whether the Government or private interests should control the commercial rights to inventions financed with Federal funds. For instance, although the research operations of the War and Navy Departments during World War II exceeded those of any other agencies, and unquestionably involved the assignment of technical staffs to the solution of specified research problems (the factors which would normally entitle the employer to the resulting inventions), neither department has asserted title to an invention except in isolated instances.[69] This is not readily explainable except in terms of the general policy of those agencies.[70]

[62] Agriculture Department, 2 REP. ATT'Y GEN. 8; Navy Department, *id.* at 260.

[63] See notes 24 and 34, *supra*. The use of a written license proved useful prior to the 1910 Act since establishment of the shop-right frequently required litigation, and in the meantime did not prevent the indirect charge of royalties to the Government via the contractor or supplier. See 2 REP. ATT'Y GEN. 110, 257, 258.

[64] Thus, it has been held that the Government (or other employer) would be entitled to ownership if the employee is "specially employed to make experiments with a view to suggest improvements," United States v. Burns, *supra*, note 16; if he "is employed to devise or perfect" the instrument or means which he invented, Solomons v. United States, *supra*, note 9; if there is an express agreement to that effect, Hapgood v. Hewitt, and Dalzell v. Dueber Mfg. Co., both *supra*, note 16; if he is "employed to invent or devise" the improvements, Gill v. United States, *supra*, note 15, at 432.

[65] United States v. Dubilier Condenser Corp., *supra*, note 9. The majority (Justices Roberts, Van Devanter, McReynolds, Butler, Brandeis, and Sutherland) held that the Government was not entitled to the patents on inventions which employees had been permitted but not expressly instructed to make, 289 U. S. 178, 193-196; the minority (Chief Justice Hughes and Justices Stone and Cardozo) thought Government ownership was justified by the fact that the employees had developed the inventions in the course of their official functions at the Government's laboratory, during regular hours and with their supervisors' approval. *Id.* at 211 *et seq.*

[66] Purporting to restate the rule in the *Dubilier* case, *supra*, note 9, the regulations of these three agencies provide that the Government shall be entitled to the ownership of inventions made within the employee's "specifically assigned duties." 2 REP. ATT'Y GEN. 12, 265, 427.

[67] 2 REP. ATT'Y GEN. 25.

[68] 2 *id.* at 266-269, 428-431. The contrary practice of the Signal Corps during the war is based upon a bureau regulation differing from the departmental regulations. 2 *id.* at 434.

[69] 2 *id.* at 259-266, 427-428.

[70] For many years the regulations of both the War and Navy Departments provided for no more than a Government license regardless of the circumstances in which the invention was made. 2 *id.* at 414-427. The Naval Ordnance Laboratory uses an "employment agreement" which apparently limits the Government to a free license (2 *id.* at 268) and the Navy recently expressed the view that scientific research workers in the Government should retain title to their inventions in all circumstances, subject only to a Government license, 3 *id.* at 302.

C. Considerations Bearing Upon a Sound Policy

The basic requirements of a sound patent policy are noncontroversial: it must serve the public interest by encouraging the fullest and widest use of the inventions of Federal employees, and at the same time it must encourage or at least not discourage future research and invention by such employees. The controversy arises in determining whether those objectives will best be achieved by private control or by public control of the commercial patent rights in such inventions.[71]

Two jurists have expressed cogent arguments for Government ownership of inventions resulting from the official activities of Federal research workers. In 1933 the late Chief Justice Stone (then Associate Justice), in a dissenting opinion in the *Dubilier* case with which Justice Cardozo concurred, expressed the view that the United States was entitled to inventions made by Government employees in the course of scientific research carried on in a Government laboratory with official approval:

> The inventors were not only employed to engage in work which unmistakably required them to exercise their inventive genius as occasion arose; they were a part of a public enterprise. It was devoted to the improvement of the art of radio communication for the benefit of the people of the United States, carried on in a government laboratory, maintained by public funds. Considerations which might favor the employee where the interest of the employer is only in private gain are therefore of slight significance; the policy dominating the research in the Bureau, as the inventors knew, was that of the government to further the interests of the public by advancing the radio art. For the work to be successful, the government must be free to use the results for the benefit of the public in the most effective way. A patent monopoly in individual employees, carrying with it the power to suppress the invention, or at least to exclude others from using it, would destroy this freedom; a shop-right in the government would not confer it. For these employees, in the circumstances, to attempt to withhold from the public and from the government the full benefit of the inventions which it has paid them to produce, appears to me so unconscionable and inequitable as to demand the interposition of a court exercising chancery powers. . . .[72]

Declaring that the majority decision permitting the employees to retain the inventions "is repugnant to common notions of justice and policy," Justice Stone continued:

> The case would be more dramatic if the inventions produced at public expense were important to the preservation of human life, or the public health, or the agricultural resources of the country. The principle is the same here, though the inventions are of importance only in the furtherance of human happiness. In enlisting their scientific talent and curiosity in the performance of the public service in which the Bureau was engaged, Dunmore and Lowell necessarily renounced the prospect of deriving from their work commercial rewards incompatible with it. Hence, there is nothing oppressive or unconscionable in requiring them or their licensee to surrender their patents at the instance of the United States, as there probably would be if the inventions had not been made

[71] The numerous studies and reports and the divergent opinions in this field since 1900 are summarized in 3 REP. ATT'Y GEN. 167-314.

[72] United States v. Dubilier Condenser Corp., *supra*, note 9, at 217-218.

within the scope of their employment or if the employment did not contemplate invention at all.[73]

Chief Justice Hughes agreed with Justice Stone's "analysis of the facts" and his "conclusions as to their legal effect," adding:

As the people of the United States should have the unrestricted benefit of the inventions in such a case, I think that the appropriate remedy would be to cancel the patents.[74]

The majority decision in that case held the employees entitled to retain the inventions under the common-law rule because their duties did not "contemplate invention," but it did not attempt to justify the rule on grounds of policy.[75] In fact, the agency there involved (the Bureau of Standards) found the majority decision so unsatisfactory as a matter of policy that it immediately promulgated a regulation, which is still in effect, calling for the assignment of all patent rights to inventions made by employees in the course of employment.[76]

A few years earlier, a Federal Circuit Court of Appeals, upholding the Government's title to the invention of an employee of the Public Health Service, made essentially the same point made by Justice Stone. Speaking for a unanimous court, Circuit Judge Parker said:

. . . there would be less reason in allowing an employee of the Public Health Service to withhold a patent from the government than in allowing an employee to withhold a patent from a private charitable organization. The Public Health Service represents the people of the United States. Its interest is their interest. Its investigations and discoveries are made for their benefit. And although neither it nor they have any interest in monopolizing inventions which may be made in the course of its studies and experiments, both have an interest in seeing that these inventions are not monopolized by any one. In the case of the fumigant gas developed by the defendant while employed and paid by the government to develop it, they are interested, not only in the use which the Health Service itself may make of it, but also and primarily in having it supplied to the public as freely and cheaply as possible. It is unthinkable that, where a valuable instrument in the war against disease is developed by a public agency through the use of public funds, the public servants employed in its production should be allowed to monopolize it for private gain and levy a tribute upon the public which has paid for its production, upon merely granting a nonexclusive license for its use to the governmental department in which they are employed. . . .[77]

The same views have been voiced in the halls of Congress. During consideration by the Senate of a bill authorizing the Bureau of Mines to construct and operate demonstration plants for the production of synthetic liquid fuels, Senator Austin of Vermont, after learning of the Interior Department's regulation providing for Government ownership of inventions made by its research employees, proposed an amendment authorizing public dedication of patents acquired under the Act.[78] Ex-

[73] *Id.* at 218-219.
[74] *Id.* at 224.
[75] *Id.* at 197-199.
[76] 2 REP. ATT'Y GEN. 98.
[77] Houghton v. United States, 23 F. 2d 386, 391 (C. C. A. 4th 1928), *cert. denied*, 277 U. S. 592 (1928).
[78] 89 Cong. Rec. 9316, 9320 (Nov. 9, 1943); 90 *id.* 3187, 3207 (March 28, 1944). The bill became the Synthetic Liquid Fuels Act of April 5, 1944, 58 STAT. 191 (1944), 30 U. S. C. §§323, 324 (Supp. 1946).

plaining his proposal, Senator Austin expressed the opinion (shared by Senator O'Mahoney of Wyoming) that:

. . . the door must be kept open to private enterprise for all discoveries in science made at the cost of the United States, or by the agencies of the United States, just as freely as physicians, under their Hippocratic oath, give their special knowledge and skill to all humanity.[79]

Similarly, during the Senate debates on the Tennessee Valley Act of 1933, a group of Senators[80] successfully supported a provision for Government ownership of inventions made by TVA employees, on grounds equally applicable to all Government agencies. Their views were summarized by Senator King of Utah, who pointed out that scientists engaged in research work at private industrial laboratories had to turn over the patents on their discoveries to the employer:

. . . the government has maintained at great expense plants, laboratories, and stations in which are conducted scientific investigations. . . . Scientific men have been and are engaged in this work. . . . They were not employed to prosecute private or individual scientific investigations, but to give of their time and of their ability to make discoveries and improvements that would be not only of advantage to the Government, but with the consent of the Government, to the entire country. . . .[81]

More recently, spokesmen for educational institutions and for organizations of scientific, professional, and technical workers also have urged a policy of public control of patentable discoveries resulting from Federally financed research. The views of these groups are exemplified in the statement of Dr. Horace M. Gray, Associate Dean of the Graduate School of the University of Illinois, presented in October, 1945, at the hearings held by a Subcommittee of the Senate Committee on Military Affairs (popularly known as the "Kilgore Subcommittee"), on a bill providing for a Federally supported program of scientific research:[82]

It is really quite unthinkable that the Federal Government should tax the citizens of this country to secure funds for scientific research, on the ground that such research promotes the general good, and then turn the results of such research over to some private corporations on an exclusive, monopoly basis. This amounts to public taxation for private privilege and violates one of the basic tenets of our democratic faith.

There is no escape from the simple and fundamental truth that new discoveries derived from research supported by public funds belong to the people and constitute a part of the public domain to which all citizens should have access on terms of equality.[83]

[79] 89 Cong. Rec. 9316 (Nov. 9, 1943).

[80] Senators Norris of Nebraska, King of Utah, Robinson of Arkansas, Fess of Ohio, and Dill of Washington.

[81] 77 CONG. REC. 2626 (1933). Senator Smith of South Carolina agreed, saying: "We ought to provide some means by which the Government would hold its hand on those discoveries of genius which revolutionize our organized society and not turn them over to corporations." *Id.* at 2629. In the course of these debates, Senator Dill suggested that Congress should provide by statute for Government ownership of the inventions of all Government employees, especially in "the light of the recent decision of the Supreme Court" in the *Dubilier* case. *Id.* at 2627.

[82] *Hearings before the Subcommittee on War Mobilization of Senate Committee on Military Affairs on S. 1297*, 79th Cong., 1st Sess. 291-292, 295 (1945). The record of these hearings will be cited as *Kilgore Hearings*.

[83] To the same effect was the testimony at these hearings given by spokesmen for the International

These principles received endorsement from President Truman,[84] a number of high government officials with experience in the field of scientific research,[85] and many prominent scientists and engineers.[86]

Spokesmen for American industry have also advocated Government ownership and public dedication of inventions made by Federal employees,[87] a position which may in part be traceable to actual experience with the opposite policy. In at least two instances, Federal employees who were left with commercial patent rights granted exclusive rights to one of a number of competing companies, creating considerable resentment on the part of the companies which found themselves subject to their competitor's power to deny them, or to charge them for, the use of technology financed with public funds.[88]

Those who have expressed disagreement with a policy of Government ownership of inventions made by Federal employees—principally spokesmen for the War and Navy Departments—do not as a rule contend that the public interest will be better served by entrusting publicly financed technology to private monopoly. Their objections are grounded almost entirely upon the contention that the grant of the commercial patent rights to the employee is a necessary means by which to attract

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Federation of Architects, Engineers, Chemists and Technicians, *id.* at 843-844; the American Federation of Labor, *id.* at 119; the National Farmers Union, *id.* at 129; the Congress of Industrial Organizations, *id.* at 861; the Independent Citizens Committee of the Arts, Sciences and Professions, *id.* at 1002; and the Association of Oak Ridge Scientists, *id.* at 320.

[84] In a special message to Congress in September, 1945, the President recommended legislation which makes "fully, freely, and publicly available to commerce, industry, agriculture and academic institutions, the fruits of research financed by Federal funds" in order that we may "derive the full profit in the future from what we have learned." (Reprinted in NATIONAL SCIENCE FOUNDATION, REPORT No. 8 ON SCIENCE LEGISLATION FROM THE SUBCOMMITTEE ON WAR MOBILIZATION TO THE SENATE COMMITTEE ON MILITARY AFFAIRS, 79th Cong., 2d Sess. 39-40 (1946).

[85] Secretary of Commerce Henry A. Wallace, *Kilgore Hearings, supra,* note 82, at 142; Commissioner of Patents Casper W. Ooms, *id.* at 701; Director of the Budget Harold D. Smith, *id.* at 102; Secretary of the Interior Harold L. Ickes, *id.* at 343-344; Dr. J. C. Hunsaker, Chairman of the National Advisory Committee for Aeronautics, *id.* at 113-114, 116; Maury Maverick, Chairman of Smaller War Plants Corporation, *id.* at 372; Col. Bradley Dewey, President of the American Chemical Society and the wartime Rubber Director of the Federal Government, *id.* at 822; Bernard M. Baruch, unofficial adviser of the President, *id.* at 911, 921-922; and P. V. Cardon, Agricultural Research Administrator of the Department of Agriculture, *id.* at 729.

[86] Dr. Harlow Shapley, Director of Harvard University Observatory, 191 HARPERS 314, 317 (Oct. 1945); Dr. Francis G. Blake, Dean of Yale University School of Medicine, *Kilgore Hearings, supra,* note 82, at 476; Dr. Thorndike Saville, Dean of Engineering, New York University, *id.* at 1006; F. Malcolm Farner, Fellow and past president of American Institute of Electrical Engineers, *id.* at 722; Dr. Harold C. Urey of the University of Chicago, *id.* at 661; and many other scientists and educators, *id.* at 543, 580, 604, 613, 895, 1030, 1088, 1148, 1186.

[87] *Kilgore Hearings, supra,* note 82, at 181, 419, 425, 1188; *Hearings before the Special Senate Committee on Atomic Energy on S. 1717,* 79th Cong., 2d Sess. 301 (1946).

[88] After research employees of the Naval Research Laboratory sold the commercial patent rights in certain important inventions, several complaints were received in 1927 from private companies, protesting that they were required to pay royalties to a competing company in order to use inventions developed in a public laboratory at public expense. The head of the Radio Corporation of America suggested that all companies should be entitled to nonexclusive licenses under such patents. 2 REP. ATT'Y GEN. 271. A similar situation was encountered in the Bureau of Mines prior to the 1942 Interior Department regulation providing for Government ownership of its employees' inventions, 2 *id.* at 177-178; and, before the turn of the century, in the Department of Agriculture, 2 *id.* at 4-6.

and retain qualified research workers, and to stimulate their inventive faculties.[89]

In appraising the soundness of this view, one is struck by the fact that every organization of scientific, technical, and professional workers which recently appeared before the Kilgore Subcommittee advocated precisely the opposite policy—one which would deny them personally any rights in inventions financed with Federal funds.[90] This position on the part of those who would presumably benefit from the retention of commercial patent rights seems to be quite representative of men of science everywhere. The late Chief Justice Stone judicially observed that "many scientists in the employ of the Government regard the acceptance of patent rights leading to commercial rewards in any case as an abasement of their work,"[91] and the Commissioner of Patents, testifying before the Kilgore Subcommittee in 1945, struck the same note:

> The argument has often been made that unless employees of a bureau . . . are permitted to retain some part of the rights to inventions produced by them while in the Government service, employees of necessary competency cannot be procured at the salaries the Government is ready to pay. I am not persuaded that this is true.
>
> . . .
>
> We have in the Patent Office hundreds of competent men, trained and working in scientific fields. They are forbidden by law to acquire interests in patents except by bequest or inheritance. Their devotion to their work is no less because of this restriction upon their right to acquire property, and you may be assured that they are confronted with the same rather low compensation scale that prevails in many Government bureaus.[92]

The Government's experience during the past five decades adds factual weight to these opinions. The Office of Scientific Research and Development, which spent almost half a billion dollars on research during the period 1940-1946, has found entirely satisfactory its policy of requiring the assignment of all rights to inventions made by its technical personnel.[93] Federal agencies which have tried both policies are unanimous in the belief that to deny commercial patent rights to their employees does not affect the ability to attract and retain competent research and technical

[89] 2 REP. ATT'Y GEN. 273-275, 453; 3 *id.* at 241-242, 270, 302. It is interesting to note that the current regulations of the War and Navy Departments (although not their actual practice thereunder) are basically inconsistent with the policy position taken by these Departments. Purporting to follow the common law rules, these regulations provide for Government ownership of all inventions made by employees within their specifically assigned duties. 2 *id.* at 265, 427. If patent rights are a necessary incentive to the Federal employee, it seems illogical to deny the incentive in the very situation where the Government is most desirous that an invention result—i.e., where the employee has been explicitly assigned or directed to make the invention.

[90] See notes 82-86, *supra.*

[91] In his dissenting opinion (with which Justice Cardozo concurred) in United States v. Dubilier Condenser Corp., *supra,* note 9, at 218.

[92] *Kilgore Hearings, supra,* note 82, at 701.

[93] 2 REP. ATT'Y GEN. 327-328. While the research sponsored by OSRD was carried out by contractors or by other Federal agencies, and not in laboratories of OSRD, the technical personnel of OSRD assisted contractors in solving the assigned problems, made suggestions and gave general directions concerning the technical aspects of the problems, and coordinated the efforts of the contractors with those of the Armed Services. 2 *id.* at 328.

personnel, nor the productivity or quality of their work.[94] The practice of the Signal Corps of the War Department during World War II, reserving the commercial patent rights to the Government, represents a conspicuous deviation by one bureau from departmental practice; nevertheless, under that policy the Corps' personnel produced a greater number of inventions than any other bureau of the War Department.[95] The personnel of industrial and institutional research organizations have produced a wealth of inventions during the past decade, although operating for the most part under a policy requiring the assignment of patent rights to the employer.[96] To this evidence of experience may be added the clear inference to be drawn from the very existence of diverse patent policies in the Government. Since the Government's salary scale is fairly uniform for like functions and responsibility, the fact that "title" agencies such as the Bureau of Standards, the Department of Interior, and the Department of Agriculture have apparently had no difficulty in adequately staffing their research sections, even though a more liberal patent policy was available at the War and Navy Departments, would indicate that the grant of commercial patent rights to the Federal employee is not necessary to attract and retain able personnel and to stimulate their inventive output.[97]

While the agencies which adopted a policy of Government ownership have generally continued it in effect to date, several agencies which as a rule leave the commercial patent rights to the employee have tended to disapprove of their own policy and to criticize its weaknesses and dangers.[98] The consensus of informed persons lists a number of objections to a policy which leaves the commercial patent rights to the Federal employee:

1. Outside organizations, including Government contractors, may be reluctant to open their files and their technical information to the Federal Government if the Federal employees with whom they deal may appropriate and patent the inventive ideas thus suggested or disclosed. This point was made by Dr. Vannevar Bush, Director of OSRD and head of the Carnegie Institution of Washington, in an official explanation of OSRD's regulation requiring its technical personnel to assign inventions made in the line of duty:

[94] This is true of the Department of Agriculture, 2 *id.* at 16, 20-22, 37, the Department of Interior, 2 *id.* at 183-184, 194-195, the National Bureau of Standards, 2 *id.* at 82-83, 102, and the Signal Corps of the War Department during World War II, 2 *id.* at 432-436.

[95] 2 *id.* at 432-436.

[96] 3 REP. ATT'Y GEN. 53-55, 62, 66-67; *Hearings before Subcommittee of Senate Committee on Military Affairs on S. 702*, 78th Cong., 1st Sess. Pt. 1, 16 (1943); *id.*, Pt. 6, at 715; *id.*, Pt. 7, at 963-964.

[97] It may be noted that Lowell, one of the inventors involved in the *Dubilier* case, left the Bureau of Standards for outside employment as a result of the controversy. Some years later he returned to the Bureau and, under the new regulations of the Bureau, agreed to assign to the Government all future patented inventions resulting from his employment. 2 REP. ATT'Y GEN. 102. For a similar incident in the Department of Agriculture, see 2 *id.* at 6.

[98] National Advisory Committee for Aeronautics, 2 REP. ATT'Y GEN. 230 *et seq;* Federal Security Agency, 3 *id.* at 301; and even the Navy Department during the Twenties, when all important research bureaus other than the Naval Research Laboratory recommended adoption of the assignment policy for research personnel. This recommendation was not adopted because of a ruling of the Judge Advocate General that the change was not permitted by law. 2 *id.* at 262-264. This view seems to be erroneous. See notes 41-50, *supra.*

Much of the effectiveness and smooth functioning of OSRD is due to the competence, diplomacy and impartiality of these technical personnel who enjoy to a high degree the confidence of OSRD contractors and of the Armed Services. An important factor in creating this confidence is the realization that the technical personnel of this Office are not seeking to establish rights for themselves as individuals in the fields of research and development for which they are acting as the Government's representatives.[99]

To the same effect is the explanation advanced in 1944 by the Signal Corps in justification of its wartime policy of calling for title to its employees' inventions:

We needed the closest possible liaison between our own and the commercial laboratories; and we found the commercial outfits reluctant to disclose their newest ideas to men who might use those ideas as springboards toward improvements, on which improvements the contractor might later be asked to pay royalties.[100]

So also wrote the Director of the Bureau of Standards in 1928:

I feel that if the time ever comes when it is recognized that Bureau employees may freely take patents along the line of their work in the Bureau and have a monopoly in the disposal of such patent rights that the reputation of the Bureau will suffer, that the confidence of industry in the work of the Bureau and the usefulness of the Bureau to industry will be seriously impaired; and that there is danger that the wholehearted cooperation with industry which the Bureau has always enjoyed in remarkable measure will suffer. Certainly these results will follow in greater or lesser measure if the impression gets abroad that our employees are competing with industry rather than bending their undivided energies to its assistance.[101]

2. Several Government officials have warned that the prospect of profiting personally from patent rights may lead to lack of harmony and cooperation within the research organization itself, and to secretiveness on the part of the employees who fear to be outdistanced in their individual race towards a patentable invention.[102] It was this factor which led the University of Chicago to decree that neither the University nor its faculty members shall derive any profits from patents:

The advancement of scientific knowledge depends on the free interchange and use of the ideas and information between scientists and research workers within a university. The basic purpose of university research may be thwarted if the free exchange or use of such information is checked or prevented by the attempt of one or a group of faculty members to profit from patentable discoveries. By removing any such incentive, the

[99] OSRD Administrative Circular 10:06, Sept. 15, 1943, quoted in 2 REP. ATT'Y GEN. 328. In the same year, Dr. Bush told the National Patent Planning Commission that "the conditions of employment, the salaries, and . . . the security of a government post should be made adequate to secure appropriate personnel," and he characterized as "inherently dangerous" the adding of an "artificial incentive," such as the "possibility of profit from commercial rights in incidental inventions." *Ibid.*

[100] 2 REP. ATT'Y GEN. 435. Another reason for the Signal Corps' policy was to allay rumors that private companies were purchasing worthless patents from employees as a form of concealed payments for favors received. *Ibid.*

[101] 2 *id.* at 101.

[102] The National Advisory Committee for Aeronautics (see Report No. 5, cited *supra*, note 4, Pt. 1, 184) and almost all bureau chiefs and research officials within the Department of Agriculture. 2 REP. ATT'Y GEN. 20.

patent rule of the University of Chicago insures that the cooperative search for truth is untrammeled.[103]

3. According to several competent authorities in the field, the Federal employee's right to retain the commercial patent rights to his inventions may make him excessively "patent-conscious," leading to neglect of his duties in favor of research more likely to result in personal profit, and also to concentration of his efforts upon "working around" the prior art in order to evolve a readily patentable idea, rather than the quickest solution of the assigned problem.[104] In the words of the Bureau of Standards,

> . . . research workers . . . will not be able to give their best efforts to the government if they are distracted from the main end in view by searching for patentable ideas along the lines of their official endeavors to inure to their own benefit. Yet if patents are to be freely granted it will be very difficult for men to avoid such considerations, whether consciously or unconsciously. . . .[105]

That this danger is not purely theoretical may be seen from the experience of the Naval Research Laboratory, which under its policy of leaving the commercial patent rights to its employees, admittedly encountered "a good many . . . troubles . . . such as technical employees giving too much attention to patents and outside work."[106] In fact, the laboratory has found it necessary to issue a regulation forbidding the "prosecution of research on matters which might have a commercial application . . . to the detriment of assigned problems" having no such promise.[107]

4. The employee's retention of patent rights may disable him from acting in the field in which he is most expert, lest he use his official position to encourage the Government's use of his own rather than a competing invention. This possibility has in fact led the War Department to disqualify some of its most valuable men from serving in a field in which they have obtained patents.[108]

5. Commercial patent rights are an inequitable and unfair form of incentive to Federal research workers because, as the Commissioner of Patents observed,

> Those working on profound fundamental problems that seldom yield readily utilizable inventions would be prejudiced as compared to those working nearer the fringe of industrial applications, although the latter may frequently be engaged upon less important and less difficult problems.[109]

[103] THE PATENT POLICY OF THE UNIVERSITY OF CHICAGO AND ITS RELATION TO RESEARCH (Bulletin issued by Business Problems Bureau of University of Chicago, March 15, 1944). See 3 REP. ATT'Y GEN. 21. The same point has been made by scientists appearing before the Kilgore Subcommittee. See *Kilgore Hearings, supra,* note 82, at 991; see also *id.* at 488, 616, 1059-1060, 1068.

[104] This point was made in 1945 by the Commissioner of Patents before the Kilgore Subcommittee, *Kilgore Hearings, supra,* note 82, at 701, and also by Dr. J. C. Hunsaker, Chairman of the National Advisory Committee for Aeronautics, *id.* at 116.

[105] 2 REP. ATT'Y GEN. 101-102. The same idea was expressed by the University of Chicago in its Bulletin, *supra,* note 103.

[106] 2 REP. ATT'Y GEN. 270.

[107] 2 *id.* at 271.

[108] 2 *id.* at 448. The problem becomes even more acute when the employee contracts in advance to turn over all future inventions to a private concern, as has happened in the War and Navy Departments, 2 *id.* at 269-271, 449, 450.

[109] *Kilgore Hearings, supra,* note 82, at 701.

Moreover, it may be difficult to select one or several out of a large group of research workers as the recipient of the rights to an invention which all collaborated in producing. And even among inventors receiving patent rights the reward is unequal, since the financial returns would depend upon fortuitous commercial factors having little relationship to the difficulty of the discovery or its importance to the public.[110]

6. Perhaps the most serious objection leveled against the policy of leaving patent rights to the employee is its effect upon the public. It has been argued that if the compensation of Federal research and technical employees must be supplemented to make their positions more attractive, the defect should be supplied by increasing the salaries or other emoluments of office, rather than by vesting the employee with the power to suppress, or to levy a private toll for the use of, an invention financed with public funds. This objection gains acuity from the well-recognized fact that the Government employee is generally in no position to exploit or manufacture the invention, and must therefore sell or exclusively license it for commercial exploitation by a private concern.[111] That concern will of course use the invention according to its best interests, and if those interests will be better served by complete suppression in order to protect an investment in earlier technology, the invention will be suppressed.[112] Clearly, a nonexclusive Government license alone cannot guarantee the fullest public benefit from the invention, nor prevent a private toll for the use of publicly financed technology, nor assure against its complete suppression; it is only Government ownership or control of the invention that can place the public interest first, and either open to the public the technology which public funds have financed, or, if conditions upon its use are desirable, frame those conditions in the public interest.

Essentially for the reasons discussed above, the Attorney General, in his Report to the President in May, 1947, recommended the adoption of a uniform policy for the Government under which the United States would receive all rights to inventions made by its employees during working hours, within the scope of their official functions, or with a substantial contribution from the Government. He further recommended that where there is some Governmental contribution to the invention or some relationship between the employee's official functions and the invention, but these are insufficient to warrant the assignment of all rights to the Government, the employee may retain the commercial rights subject to a royalty-free, nonexclusive license in the Government, and also subject to an obligation to make the invention available to the public on reasonable terms.[113] This policy would seem to be thoroughly justified by the Government's experience during the past fifty years.

[110] Commissioner of Patents Ooms characterized the grant of commercial patent rights to Federal employees as making Government service "a lottery with big stakes." *Ibid.*

[111] The experience in the agencies which permit the employee to retain the patent rights is that he almost always sells it to a company operating in the field. 2 REP. ATT'Y GEN. 24, 51, 55, 172-173.

[112] See Continental Paper Bag Co. v. Eastern Paper Bag Co., 210 U. S. 405 (1908); Special Equipment Co. v. Coe, 324 U. S. 370, 378 (1945).

[113] 1 REP. ATT'Y GEN. 19, 56-62.

III

THE INVENTIONS OF GOVERNMENT CONTRACTORS

A major portion of the research and devolopment activities financed by the Federal Government is carried on by outside organizations, under contracts or other arrangements with the United States. For example, of $1,700,000,000 expended upon scientific research and development during the war period by the three top research agencies (War, Navy and OSRD), more than 80 percent was spent under research and development contracts with private corporations, educational institutions, and nonprofit research organizations.[114] The private research laboratory, usually an adjunct of an industrial concern, has received the lion's share of the total Federal funds spent on research contracts, a substantial portion of the remainder being paid to academic institutions.[115]

A. Applicable Legal Principles

In the absence of a statute prescribing the disposition to be made of the patent rights to inventions evolved during the performance of a Government research contract,[116] the parties are free to agree to any allocation of rights. Since the organizations to which Government contracts are awarded almost always require the employees detailed to the contract to turn over all patent rights in resulting inventions,[117] the issue becomes essentially whether the contractor or the Government should control the commercial patent rights.

The Government research contract usually contains specific provisions for the allocation of patent rights between the contractor and the Government, but in the relatively rare instances in which the research contract is silent on this score and where no agreement can be implied from the circumstances,[118] the principles pertinent to the employer-employee relationship would probably be applied by the courts.[119] Under those principles, the Government would be entitled to the ownership of all inventions made by the contractor or his employee in the course of performing a contract which contemplated invention, and to a nonexclusive royalty-free license if that factor were not present.

[114] See reports cited *supra*, note 4; and 2 REP. ATT'Y GEN. 243, 326-327, 409.

[115] Report No. 5, *supra*, note 4, at 74, 298, 310.

[116] There is apparently no such statute in respect of research contracts, although a Congressional policy may sometimes be derived from a measure such as the Synthetic Liquid Fuels Act of 1944, *supra*, note 10, providing for public dedication of patents acquired thereunder.

[117] See 3 REP. ATT'Y GEN. 53-55, 62-66. Government research contracts sometimes contain a representation and agreement by the contractor that he has not made and will not make any arrangement impairing his ability to grant the Government the patent rights called for by the contract. 2 *id.* at 301, 465-466.

[118] *Cf.* 32 OPS. ATT'Y GEN. 556, 563 (1921).

[119] See Ordnance Engineering Corp. v. United States, 68 Ct. Cl. 301, 352 (1929), *cert. denied*, 302 U. S. 708 (1937); McKinnon Chain Co. v. American Chain Co., 259 Fed. 873, 876, 878 (N. D. Pa. 1919). Both cases, although dealing with the rights to inventions evolved in the performance of a contract, cited and applied Solomons v. United States, *supra*, note 9, which dealt solely with patent rights to inventions made by an employee.

B. The Current Practice

The several Government agencies which enter into research contracts on a substantial scale fall into three groups in regard to the type of patent provisions inserted in the contract. One group, which usually stipulates for Government ownership or control of inventions resulting from the contract, includes the Rubber Reserve Company and the Defense Plant Corporation,[120] the Department of the Interior,[121] the Department of Agriculture,[122] and the Tennessee Valley Authority.[123] A second group, which generally leaves the patent rights to the contractor subject only to a nonexclusive, royalty-free license in the Government, consists of the War Department (except the Quartermaster Corps during World War II),[124] the Navy Department,[125] the Civil Aeronautics Administration,[126] and the research branch of the WPB.[127] The third group, which makes substantial use of both types of patent clauses, includes OSRD,[128] the National Advisory Committee for Aeronautics,[129] and

[120] Rubber Reserve Company and Defense Plant Corporation, RFC subsidiaries, usually obtained a free Government license with the right to sublicense others under the inventions resulting from its research contracts. If a private company operating an RFC-owned plant as agent or lessee conducted research at its own expense, the Government acquired a free license running with the plant. 2 REP. ATT'Y GEN. 356-373.

[121] The Department of Interior enters into cooperative research arrangements with outside organizations for the pooling of facilities and personnel, and requires either public dedication or Government ownership of inventions made in the course of such projects by employees of either the department or the contractor. If the contractor is a commercial organization, the patents are left to it subject to a free Government license and to the obligation to issue nonexclusive licenses to all applicants at a reasonable royalty. 2 *id.* at 200-203.

[122] In its grants to State Experiment Stations and land-grant universities to finance experimental and research projects, the Department of Agriculture stipulates for public dedication or Government assignment of resulting inventions, unless the grant is to be expended under the exclusive direction of the grantee. 2 *id.* at 22-24.

[123] The Tennessee Valley Authority requires an assignment of the patent rights but if the contractor bears part of the cost, the net proceeds of licensing (after payment of 5% to the inventor) are divided with him. 2 *id.* at 396-397.

[124] Of 11,500 research contracts totalling over half a billion dollars, awarded by the War Department in fiscal years 1940-45, only 37 called for an assignment of full title to the Government; all the others left the patents to the contractor subject to a free, nonexclusive license to the Government, sometimes plus a free license under other patents of the contractor covering the article called for by the contract ("reproduction rights"). Regulations promulgated in April, 1945, contemplate a somewhat greater use of the "assignment" clause in special situations. *Kilgore Hearings, supra,* note 82, at 1089, 1183; 2 REP. ATT'Y GEN. 455-465, 471-472 (1947). The Quartermaster Corps and the Ordnance Department have deviated to some extent from the War Department's practice.

[125] The Navy Department almost always has left the patent rights to the contractor, subject to a free Government license, and sometimes plus an option to purchase reproduction rights. Of about 2350 research contracts entered into during the war (all but about 100 being with commercial concerns), not one seems to have stipulated for the assignment of title to the Government. 2 REP. ATT'Y GEN. 290-295, 301-302.

[126] The Civil Aeronautics Administration recently recommended to the Secretary of Commerce that the practice be changed to call for assignment of title to the Government. 2 *id.* at 127-128.

[127] The Office of Production Research and Development of the War Production Board customarily left the patent rights to the contractor subject to a Government license and an option to purchase "reproduction rights." In a few exceptional cases, where research was done upon a basic invention owned by the Government, WPB stipulated for an assignment. 2 *id.* at 494, 499-502.

[128] The Office of Scientific Research and Development was second only to the War Department in its wartime research expenditures, having spent about half a billion dollars in the period 1941-1946, of which about two-thirds went to academic institutions and one-third to industrial laboratories. In about one-third of all contracts (involving two-thirds of the total expenditures), OSRD required a full assign-

for a time during World War II included the Quartermaster Corps of the Army.[130] But taken as a whole, most Government research contracts, involving the major portion of the total dollar amount, leave the commercial patent rights to the contractor. This practice differs from that pursued by private or institutional laboratories, which as a rule grant the financial sponsor the ownership of or an exclusive license under the patent rights.[131]

C. Policy Considerations

The issue as to whether the research contractor or the Government should control the patent rights to inventions made in the performance of the contract involves much the same considerations and arguments as those discussed above in connection with the Government employee, but there is one important difference: since the inventor will as a rule retain no rights to his invention, the "incentive to invent" becomes a matter of the acceptability of the terms of the contract to the prospective contractors. Apart from that factor, there seems to be little controversy that the sounder policy is for the Government rather than the contractor to obtain the patent rights under the contract. The view that the technological products of expenditures from the public treasury should inure to the benefit of the public which financed them, and that private interests should not be permitted to exclude the public from the use of such products or to levy a charge for their use, would seem to be equally valid whether the instrumentality employed by the Government to evolve the technology is research contractor or Federal employee. In fact, the representatives of Government, science, and education who urged this view before the Kilgore Subcommittee in 1945 were directing their statements to proposed legislation authorizing Federal aid to scientific research and development by means of "contracts, grants, or other forms of assistance."[132]

The specific objections raised against a policy which permits Federal employees to retain commercial patent rights to inventions made in the course of employment are also pertinent, in somewhat modified form, to the research contractor, particularly where the latter is a private company. The contractor who is permitted to profit

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ment of patent rights; in all the rest (which included almost all contracts with industrial concerns and about half of those with academic institutions) OSRD left the patent rights to the contractor subject to a free Government license plus an option to purchase "reproduction rights." 2 *id.* at 330-337; *Kilgore Hearings, supra,* note 82, at 1121.

[129] 2 REP. ATT'Y GEN. 233-234.

[130] For about six months prior to April, 1945, when new regulations were issued by the War Department, the Quartermaster Corps attempted as a matter of policy to include an "assignment" provision in its development contracts, and succeeded in about half of all cases, being responsible for 14 of the 37 War Department contracts awarded with such a clause during the period 1940-1945. The clause was not used by the Quartermaster Corps if the contractor advanced "cogent objections." The Ordnance Department also used assignment clauses in a few instances for purposes of secrecy where the Government's interest in the inventions was deemed sufficiently acute. 2 *id.* at 461-462.

[131] 3 REP. ATT'Y GEN. 54, 73. Some educational institutions retain the patent rights and grant a free license thereunder to the sponsor. 3 *id.* at 56.

[132] S. 1285, 79th Cong., 1st Sess. (1945) §2. This was one of the bills on which the Kilgore Subcommittee held hearings. See *Kilgore Hearings,* Pts. 1-5, *supra,* note 82.

from the Government-financed patents will tend to prefer research projects offering prospects of commercially valuable inventions, and to decline contracts dealing with research in the basic sciences; or, after accepting a contract, he may be led to concentrate the efforts of his staff on "working around" the prior art in an effort to obtain a patentable invention, rather than on the immediate solution of the problem at hand. While collaboration with others may not be as important a factor as in the case of the Federal employee, the contractor will tend to keep his progress secret from others working in the same field, thus discouraging cooperation and pooling of information. And commercial patent rights are as haphazard and unequal a medium of compensation to research contractors as to Federal employees.

Besides the foregoing objections, common to both the research contractor and the Federal employee, those who urge public ownership of technology financed with Federal funds adduce two additional arguments applicable to private contractors:

1. No one would attempt to justify the expenditure of public funds in order to strengthen the position of one private concern in a competitive industry; yet the practice of leaving the patent rights to the contractor, particularly where the latter is an industrial concern, may have that very effect. For this reason Rubber Reserve Company, in all its research and development contracts, reserved the power to throw open resulting inventions to the entire industry on equal terms, lest "private corporations . . . enhance their individual patent positions in the synthetic rubber field as an incident to research paid for by the Government."[133] The same point was graphically made at the hearings on the Atomic Energy Act of 1946[134] before the special Senate Committee on Atomic Energy, during a discussion of the patent provisions of the bill:

> [Senator Millikin of Colorado] Take two big companies. One big company hasn't had this Government business; the other big company has, or the other big company has had the Government business as a result of Government money through the whole operation of our system, coming out with improvements and patents that puts the other big company under somewhat of a disadvantage. The other big company can say, "We paid our share of taxes to put our competitor in the better position he now is in."
>
> The Chairman. [Senator McMahon of Connecticut] And I might also point out, Senator, to further fortify the question, that A company might in the field have been put over to making tanks, where there was no possible peacetime advantage—that is, assuming they both competed in the same line of work—and then B company, which you are talking about that gets this exclusive right has an advantage, and A company would certainly be in a stronger position to complain about it.[135]

The fear was also expressed by the Committee that the retention of patent rights by the contractor in the field of atomic energy research would give him "an unearned privilege" and a head-start in a vitally important new field, with public funds.[136]

[133] 2 REP. ATT'Y GEN. 362-363.
[134] 60 STAT. 755, 42 U. S. C. A. §1801 *et seq.* (Supp. 1946).
[135] *Hearings before Special Senate Committee on Atomic Energy on S. 1717*, 79th Cong., 2d Sess. 351 (1946).
[136] *Id.* at 338-358.

The Act as passed contained a provision for Government control and licensing of all inventions relating to the field of atomic energy.[137]

2. A second major objection is that retention of patent rights by the industrial contractor may contribute to the ever-increasing concentration of economic and industrial power in fewer and fewer companies, a tendency regarded by many as a serious threat to the survival of our democratic system of free competitive enterprise. The size of the Government's current expenditures for research and the very large share thereof which is paid to private contractors lends special significance to the Government's role. During the five fiscal years 1940-1944, one billion dollars of Federal funds, about half of the Government's total research budget, was paid to almost two thousand private companies under contracts for research and development. But fully two-thirds of this billion dollars went to the largest sixty-eight concerns, and more than one-third went to the top ten corporations. Since under all but a minor percentage of these contracts the private contractor retained the commercial patent rights to inventions resulting from the work, the effect of the research contracts was to reenforce the already dominant commercial position of the largest contractors. The great danger of this situation to our system of free enterprise was described by the Smaller War Plants Corporation in a Report to a Senate Committee:

> In the long run the concentration of economic power may be greatly strengthened as a result of this centralization of research. The peacetime applications and uses of this scientific knowledge will be enormous. The nature of most scientific research is such that it has a wide variety of practical applications—military as well as peacetime. Obviously the companies in whose laboratories this research work has been carried on will be its chief beneficiaries not only because of their direct acquaintanceship and knowledge of the research but also because of patents. The investigations of the Subcommittee of War Mobilization of the Senate Military Affairs Committee show that over 90 per cent of the contracts made between Government agencies and private industrial laboratories for scientific research and development placed the ownership of patents with the contractor, the Government receiving a royalty-free license for its own use. The research contracts of the War Department, Navy Department, Reconstruction Finance Corporation, and Office of Scientific Research and Development—which accounted for 98 per cent of the Federal funds spent for research in private industrial laboratories—were generally of this nature. The only exception were patents on military items which were considered by the War and Navy Departments to be of a highly strategic character.
>
> This means, in effect, that the large corporations which carried on the great bulk of the federally financed wartime industrial research will have control, through patents, of the commercial applications of that research.[138]

Former Secretary of Commerce Wallace recently expressed the same view to a House subcommittee at hearings on a bill to establish a National Science Foundation with the power to support scientific research. Objecting to a provision of the

[137] Section 11 of the Atomic Energy Act of 1946, 42 U. S. C. A. §1811 (Supp. 1946).

[138] ECONOMIC CONCENTRATION AND WORLD WAR II, REPORT NO. 6 OF SMALLER WAR PLANTS CORPORATION TO SPECIAL SENATE COMMITTEE TO STUDY PROBLEMS OF AMERICAN SMALL BUSINESS, 79th Cong., 2d Sess. (1946).

bill which would permit the Foundation to leave patent rights to contractors, the Secretary stated:

> They perpetuate and give the approval of the Congress to the past and present unsound policies followed by some Government agencies. The private research contractors of the Foundation will not be small and independent business enterprises; they will be the big corporations with large and well-equipped laboratories which already have a tremendous advantage over their small competitors by virtue of the scientific and technical improvements which they alone can afford to develop and to patent. The provisions of H. R. 6448 will provide Government support and financing to the research and patents of big business and lead to further industrial concentration, lessened competition, and the stifling of small business and new enterprise.[139]

Military authorities and a Senate Committee have noted the desirability of a broad, diversified base in industry and science, with as many units as possible standing ready to serve the nation in time of crisis.[140] This objective may be hindered by the policy of leaving the patent rights to the private contractor, for the increased concentration of industrial research facilities in a few large industrial corporations means that "the overwhelming majority of American businesses" will lack "adequate access to the benefits of scientific research and advancement."[141] That the free exchange of ideas among many companies operating in the same field will greatly accelerate scientific progress has been dramatically demonstrated by the Government's experience during the war in the fields of penicillin[142] and synthetic rubber.[143]

The proponents of the policy of permitting contractors to retain the commercial patent rights do not challenge the validity of the foregoing views.[144] Their position is in effect that the weaknesses and dangers of that policy are the lesser evils, because, according to them, (1) the fullest use and exploitation of an invention is more likely to result under exclusive private control of the patent rights, especially where a substantial investment is required for commercial development;[145] and (2) the best qualified private laboratories would be unwilling to accept Government research contracts which do not leave them the commercial rights to resulting patents.[146]

A simple answer to the first objection would seem to be that if exclusive licenses

[139] *Hearings before Public Health Subcommittee of House Committee on Interstate and Foreign Commerce on H. R. 6448*, 79th Cong., 2d Sess. 83 (1946).

[140] SUBCOMMITTEE REPORT No. 8, NATIONAL SCIENCE FOUNDATION, REPORT ON SCIENCE REGULATION FROM SUBCOMMITTEE ON WAR MOBILIZATION TO SENATE COMMITTEE ON MILITARY AFFAIRS, 79th Cong., 2d Sess. 39-40 (1946); 2 REP. ATT'Y GEN. 291.

[141] See Report No. 6, *supra*, note 138, at 53.

[142] 2 REP. ATT'Y GEN. 336-337.

[143] 2 *id.* at 355-356, 362-363.

[144] A Report of the Kilgore Subcommittee in February, 1946, stated that "There was no disagreement with this fundamental principle [that the results of research fully financed by Federal funds should be made publicly available] on the part of any witness who appeared before the Subcommittee or on the part of the thousands of individuals who have expressed interest in the legislation under consideration." See Report No. 8, cited *supra*, note 140, at 11.

[145] See testimony of Dr. Bush of OSRD before Kilgore Subcommittee, *Kilgore Hearings, supra*, note 82, at 225-227.

[146] This view is advanced by spokesmen for the War and Navy Departments and by Dr. Bush of OSRD. See 2 REP. ATT'Y GEN. 299, 302, 463; 3 *id.* 35, 37-38, 206-207, 250, 255, 257, 305-306, 366, 423-424, 1050, 1090-1091.

are in fact necessary and desirable, the Government itself could grant them after obtaining Congressional approval where that is needed. At least that would permit a selection to be made of the inventions whose exploitation requires an exclusive right, so that the remainder could be thrown open to the public. Moreover, the Government could attach conditions to its grant of exclusive licenses in order to guard against suppression or misuse of the inventions.

Apart from this, however, the objection that Government ownership inhibits the fullest exploitation of the invention is not borne out by actual experience. Opinion within the Government has been divided as to the necessity or desirability of issuing exclusive licenses under Government-owned inventions in order to stimulate their fullest exploitation by private capital,[147] but the experience in the Government would indicate that a policy of nonexclusive licensing is for the most part sufficient to bring inventions into general use. During the period 1942-1945, the Office of the Alien Property Custodian offered to grant royalty-free, nonexclusive licenses under some 22,000 inventions seized from the enemy, and actually issued about 1,800 licenses to almost 1,000 licensees under approximately 11,000 patents and applications. During the same three-year period the Custodian also offered to grant *exclusive* licenses for limited periods to applicants who could demonstrate that exclusive rights are necessary for fullest exploitation of the technology. Only seven applicants filed preliminary requests for exclusive licenses, alleged to be necessary in order to recoup "development costs," but none of these ever filed a final application for an exclusive license or made the requisite showing of need for such a license. Some of these seven applicants were in fact content with nonexclusive licenses. The Custodian recently reported that his policy of nonexclusive licensing has been eminently successful, and that a large number of improvements upon the licensed inventions have resulted from their manufacture and use by many concerns rather than by a single licensee.[148]

This experience is matched by that of the Research Corporation and the Chemical Foundation, two large nonprofit organizations engaged in the exploitation of inventions, which have found that a policy of nonexclusive licensing is successful in bringing their inventions into general commercial use.[149]

The point of view of the American scientist on this issue is exemplified by the

[147] That it is necessary in some cases has been the view of some officials of the Department of Agriculture. *Kilgore Hearings, supra,* note 82, at 729-730; 2 REP. ATT'Y GEN. 35-36; and of Dr. Bush of OSRD, *Kilgore Hearings, supra,* note 82, at 225-227. That it would be necessary only in exceptional cases was the opinion of officials within the War Department, 2 REP. ATT'Y GEN. 479-483, Interior Department, 2 *id.* at 207-208, and the Bureau of Standards, 2 *id.* at 131. That it is neither necessary nor desirable was the belief of Commissioner of Patents Ooms, Secretary of the Interior Ickes, Secretary of Commerce Wallace, *Kilgore Hearings, supra,* note 82, at 140, 340, 698, and several officials in the Department of Agriculture, 2 REP. ATT'Y GEN. 31-36.

[148] *Kilgore Hearings, supra,* note 82, at 675-678, 681-685, 688. This experience is particularly significant since the Custodian is one of the few Government agencies with the power to issue exclusive licenses.

[149] 3 REP. ATT'Y GEN. 9, 12, 54. Most universities issue only nonexclusive licenses under their patents. 3 *id.* at 57.

testimony before the Kilgore Subcommittee of Dean Gray of the University of Illinois Graduate School:

> There is no convincing evidence in support of the contention that new discoveries would remain unutilized if patent rights were held by the Federal Government and made freely available to all. All we have on this point is the allegation of certain monopolistically minded groups that they would not care to develop new discoveries on such a basis. But our economic history indicates clearly that where competition with respect to new developments has prevailed American businessmen have been quick to take advantage of such opportunities. I know of no quicker or surer way to stimulate production, provide employment, and raise the standard of living than for the Federal Government to use its great power and resources to unlock the treasures of modern science and to make them available to all on equal terms.[150]

It is significant that apparently no representative of American industry has argued for exclusive licenses under Government-owned patents; on the contrary, the industry spokesmen before Congressional committees have unanimously advocated free public dedication not only because those discoveries were "acquired at the expense, through taxes, of citizens of the United States,"[151] but also because "the private-enterprise system will best be preserved if all Government-owned patents . . . are thrown open to the entire public without governmental regulation or restriction."[152]

Industry's objection to any policy other than public dedication or nonexclusive licensing of Government-owned inventions is basically due to the desire to avoid the regulation and policing likely to be a concomitant of licensing.[153] Another objection lies in the difficulties of selecting the recipient of the exclusive licenses without favoritism or discrimination; for if the traditional technique of competitive bidding is used, it would inevitably favor the larger and wealthier bidders.[154]

Moreover, Government authorities have pointed out that there are other means to encourage and stimulate commercial exploitation of Government technology. Publicity, demonstration projects, and other promotional devices have been used with good results by the Alien Property Custodian.[155] Another tested device is for the Government to finance or subsidize the pilot-plant or experimental stages of the manufacture or use of the invention, thus lessening the private financial risk involved in pioneer production. This procedure has been found preferable to exclusive licensing by the Tennessee Valley Authority[156] and other Government agencies.[157]

[150] *Kilgore Hearings, supra,* note 82, at 291-292.

[151] Testimony of Chairman of Committee on Patents and Research of the National Association of Manufacturers at *Hearings before the House Patents Committee on H. R. 5842 and H. R. 5940,* 79th Cong., 2d Sess. 3-4 (1946). To the same effect, see statement of same witness, *Kilgore Hearings, supra,* note 82, at 181.

[152] Testimony before Kilgore Subcommittee of the Vice-president in charge of development, Standard Oil Company of Indiana, *Kilgore Hearings, supra,* note 82, at 419, 425. See also the testimony in behalf of the American Patent Law Association, *id.* at 1188.

[153] *Kilgore Hearings, supra,* note 82, at 177-178, 419, 425.

[154] This point has been made by Col. Lippincott of the War Department, 2 REP. ATT'Y GEN. 481-482, and by the Alien Property Custodian, *Kilgore Hearings, supra,* note 82, at 681-682.

[155] 2 REP. ATT'Y GEN. 67-68; *Kilgore Hearings, supra,* note 82, at 677, 685, 688.

[156] 2 REP. ATT'Y GEN. 399.

[157] Such as subsidiary corporations of R. F. C., 2 *id.* at 356, and the Office of Production Research and Development of the War Production Board, 2 *id.* at 493.

The remaining and the most serious objection against any change in the current policy of leaving commercial patent rights to the contractor is advanced by spokesmen for the Armed Services and for industry. That objection is that the best organizations, particularly among industrial laboratories, will decline to accept Government research work unless left with the patent rights, or will quote much higher prices for the research to compensate for the denial of patent rights.[158] Proponents of this view assert that the difficulties will be even more pronounced where the contractor has already made independent progress towards the solution of the problem, so that turning over the resulting patents means giving the Government, gratis, the fruits of the contractor's earlier independent efforts.[159]

At the outset, it may be noted that the argument is restricted to industrial laboratories, for under current practice most of the academic and other nonprofit research organizations either leave the patent rights to the financial sponsor of the research project or else dedicate the inventions to the public.[160] For example, OSRD reserved all patent rights under research contracts totalling over $325,000,000, awarded principally to academic institutions, and representing about one-third of all OSRD contracts.[161] And as applied to the industrial laboratory, there is a very meager basis upon which to test the validity of the argument in the light of actual experience.

The meagerness of evidence stems from the fact that during the recent decade, when the research contract began to be used on a large scale, the predominant practice in the Government was to leave the patent rights to private industry. The three Federal agencies which spent about 95 per cent of all Government research funds during World War II (the War and Navy Departments and OSRD) as a matter of policy left the patents to the private contractor, stipulating for Government ownership in only a small percentage of all cases.[162] Nevertheless, such evidence as there is indicates that the percentage of patents assigned to the Government would have been considerably greater if the affirmative policy of Government had been to require assignments, and that most eligible research organizations would not refuse research contracts guaranteeing them a reasonable profit on their work, particularly if a uniform policy of Government precluded more favorable terms from another agency. For example, during World War II the War Department reserved title to resulting patents in less than 1 per cent of all its research contracts and the Navy Department in practically none;[163] yet the Quartermaster Corps, when it adopted and affirmatively enforced an opposite policy, succeeded in obtaining a title stipulation in almost half of all its research contracts.[164] The Rubber Reserve Company has

[158] 2 *id.* at 299, 302, 463; 3 *id.* at 250, 305-306.

[159] 3 *id.* at 35, 37-38, 206-207, 255, 257, 366, 423-424, 1050, 1090-1091.

[160] 3 *id.* at 53-56, 73.

[161] 2 REP. ATT'Y GEN. 332.

[162] See notes 124, 125, 128, *supra.*

[163] 2 REP. ATT'Y GEN. 302, 458-460, 463-465; *Kilgore Hearings, supra,* note 82, at 1089, 1183.

[164] 2 REP. ATT'Y GEN. 462. The Ordnance Department was also successful in obtaining such stipulations where it considered secrecy necessary or for other reasons. 2 *id.* at 461. This was at a time when more favorable terms were available from the Navy Department and from all other branches of the War Department. The Armed Services usually paid the research contractor sufficient to cover costs, overhead and a reasonable profit, and also left him the commercial patent rights. 2 *id.* at 460; see *Kilgore Hearings, supra,* note 82, at 255-257.

been uniformly successful during the war in sponsoring research in the synthetic rubber field, under contracts which gave the Government the power to throw open the resulting inventions to the entire industry.[165]

Another relevant bit of experience comes from the atomic energy field. The early research contracts awarded under the Manhattan District's atomic energy project left the patent rights to the contractors subject only to a Government license, but in the late spring of 1942 President Roosevelt directed Dr. Bush of OSRD "to arrange as far as possible for the vesting in the Government of the title to patents on inventions and discoveries made on the project." At the Government's request virtually all contractors agreed to retroactive revision of their contracts to provide for Government ownership of the inventions, including some upon which patent applications had already been filed, and thenceforth all research contracts dealing with the project reserved to the Government full power over patent rights.[166] Other agencies which reserve title to the patent rights as a matter of policy seem to have had no difficulty in obtaining qualified organizations to carry on the desired research.[167]

The inference seems reasonable that American industry has obtained the commercial patent rights under most of its research contracts with the Government because that has been the policy of the three largest research agencies; that the policy of reserving the patent rights to the Government should prove equally effective if affirmatively put into practice throughout the Government; and that American industry would not refuse to make its facilities available to the Government on a basis which guarantees it against risk of loss and assures it a reasonable profit.

The situation may, of course, arise where the most experienced organization in the field has already made considerable progress towards solution of the technical problem posed by the Government research contract, so that the organization may refuse to take on the work unless its prior contribution is recognized by the award of all resulting patents.[168] Perhaps the soundest manner of dealing with such situations would be to find the second best organization; for the progress already made by the first company and the investment involved will ordinarily be sufficient to guarantee continuance of the work to completion. To finance another company's efforts in the field may have the multifold advantage of stimulating the first concern to even greater efforts, of adding independent thought and facilities to solution of the problem, and of broadening the research experience in the industry.[169] But if

[165] 2 REP. ATT'Y GEN. 356, 374-375.

[166] *Hearings before Special Senate Committee on Atomic Energy on S. 1717*, 79th Cong., 2d Sess. 332-334, 338, 341, 352 (1946). Secretary Patterson told a House Committee shortly thereafter that the War Department had acquired "virtually all" of the inventions and patents existing in the atomic energy field. *Hearings before the House Committee on Military Affairs on S. 1717*, 79th Cong., 2d Sess. 45 (1946).

[167] Agriculture, 2 REP. ATT'Y GEN. 22-24; Interior, 2 *id.* at 200-203; TVA, 2 *id.* at 396-397; National Advisory Committee for Aeronautics, 2 *id.* at 233-234.

[168] This point was made before the Kilgore Subcommittee by representatives of the War and Navy Departments and by Dr. Bush of OSRD. See *Kilgore Hearings, supra*, note 82, at 249-251, 254-256.

[169] Dr. Philip R. White of the Rockefeller Institute for Medical Research told the Kilgore Sub-

an emergency precludes this alternative, there is available the procedure embodied in the Kilgore bill[170] and recommended by the Attorney General in his report:[171] the patent rights could be left to the contractor subject to a Government license, and with appropriate safeguards to protect the public against suppression or unreasonable use of the inventions to which public funds contributed.

The proponents of the present policy warn that to reserve patent rights to the Government would increase appreciably the cost of Government research.[172] The actual experience contradicts this view. For instance, the half billion dollars' worth of research contracts awarded by OSRD during the period 1940-1945 repaid the contractor his actual costs plus a percentage of the direct labor costs as an overhead allowance (100 per cent of the direct labor costs for industrial contractors, and 50 per cent for institutional contractors). This basis was the same whether the Government or the contractor obtained the commercial patent rights. Moreover, OSRD reserved title in about half the contracts with institutions; yet the compensation formula was not only the same as that used in the other institutional contracts which gave the patents to the contractors, but was less than that embodied in the industrial contracts which also gave the patents to the contractors.[173] Likewise, the research and development contracts financed by Rubber Reserve Company and by Defense Plant Corporation, which gave the Government the right to throw open the resulting inventions to the entire industry, were awarded on the same payment basis as the contracts of other RFC subsidiaries calling only for a nonexclusive Government license.[174]

The uniformity of compensation regardless of the type of patent stipulation may be attributable to the difficulty of evaluating future inventions. The prudent businessman, because of the unknown factors involved in the commercial success of an invention not yet produced, must place a very low or a purely nominal valuation upon it, and the practice in industrial laboratories bears this out.[175] The indications from experience are therefore that the disposition of patent rights under a research contract will not have an appreciable effect upon the compensation the contractor will expect to receive. But even if some greater cost should result, the question may well be asked whether it would not be wiser to pay that increase out of the general

committee that if a policy of public ownership would tend to discourage participation in Federal research by the large industrial concerns, "This will be all to the good since such concerns do not need Government support, and small businesses and the general public stand only to gain from a rigorous patent policy." *Id.* at 604.

[170] *Id.* at 10.

[171] 1 REP. ATT'Y GEN. 109-110.

[172] *Kilgore Hearings, supra,* note 82, at 206-207, 255-257; 2 REP. ATT'Y GEN. 303, 338-339.

[173] 2 REP. ATT'Y GEN. 330-336.

[174] 2 *id.* at 374-376.

[175] Dr. Bush, before the Kilgore Subcommittee, characterized any evaluation of future patent rights as an attempt to "force negotiation on a very intangible basis." *Kilgore Hearings, supra,* note 82, at 207. Industrial laboratories, which require their technical and research employees to assign all patent rights to the company, usually pay no extra compensation on that account; those that do, pay a very nominal amount. *Id.* at 1187; 3 REP. ATT'Y GEN. 242, 246-247.

public funds, rather than to save it by enabling the contractor to levy a royalty upon the use of the invention, or even to deny its use to the public in order to protect his stake in older processes.

Essentially for the above reasons the Attorney General, in his May, 1947, Report to the President, recommended the establishment of a Government-wide policy requiring that contracts for research and development work financed with Federal funds should reserve to the United States all rights to inventions produced in the performance of the contract, except in emergencies; and that where an emergency requires an exception to this basic policy because of inability to find a qualified organization willing to take on the contract with the basic patent stipulation, the contract may leave to the contractor the commercial rights in inventions to which he has already made a substantial independent contribution, subject to a royalty-free, nonexclusive license to the Government, and also subject to the obligation on the part of the contractor (or his assignee) to place the inventions in adequate commercial use within a designated period.[176] The Attorney General also recommended that, as a basic policy, all Government-owned inventions be made fully available to the public without charge, by public dedication or royalty-free, nonexclusive licensing.[177]

IV

CONCLUSION

The policy which should be followed in regard to the control of patentable inventions produced in the course of Government-financed research is one of major current importance in both economic and social terms. The three-year investigation upon which the Attorney General based his report and recommendations is unquestionably the most exhaustive and comprehensive yet made, and although the past forty years have been marked by a series of unsuccessful attempts to evolve a sound uniform Government policy, there is some ground for the belief that the latest effort will prove more effective. Whether or not the policy recommended by the Attorney General is adopted throughout the Government, the attention focused upon the problems may at least encourage a trial of the policy by enough Government agencies to furnish a fair test of its wisdom.

[176] 1 REP. ATT'Y GEN. 109-110.
[177] 1 *id.* at 130-131.

PATENTS AND ATOMIC ENERGY*

JAMES R. NEWMAN† AND BYRON S. MILLER‡

In the patents section of the Atomic Energy Act of 1946 (Section 11),[1] two basic concepts, each regarded as fundamental to our political system, collided head-on. These were security, as we had with some dismay begun to understand the term in the beginning of the atomic age, and the institution of private property, as expressed here in the hallowed forms of the patent system. The conflict between these irreconcilables was reflected in the debate over most of the major provisions of the Act, but nowhere was it so clearly defined and so bitter as in the struggle over the patent provisions.

The simple expedient whereby during the war private patent applications involving the national security were kept secret by the Commissioner of Patents provided only a partial solution. This action was authorized by an Act of Congress[2] passed during the first World War, which empowered the Commissioner to keep certain inventions secret and withold the issuance of certain patents in *wartime.* Although this power was broadened in 1940[3] to authorize the Commissioner to withhold the issuance of patents of military value for such periods as he might determine, presumably the Act of 1940 extends only to applications filed in wartime, and those filed after the end of the war would not be covered. Nor would the statute[4] under which atomic energy inventions were handled during the war prove helpful, since that law is limited to government-owned inventions. In any event, all these techniques merely postponed issuance of the patent—none contemplated control of the patent after issuance.

The very nature of the patent system requires the disclosure in detail of the device or process to be patented. In the patent application there must be a description of the invention and its manufacture and use "in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected . . . ."[5] to duplicate it. Thus, if a new device for producing fissionable material were patentable, the patent application would of necessity recite every relevant detail, the patent would be published, and

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[1] 60 STAT. 768, 42 U. S. C. A. §1811 (Supp. 1946).

[2] 40 STAT. 394 (1917), as amended, 35 U. S. C. §42 (1940).

[3] 54 STAT. 710, 35 U. S. C. §42 (1940).

[4] REV. STAT. §4894 (1875), as amended, 35 U. S. C. §37 (1940).

[5] REV. STAT. §4888 (1875), as amended, 35 U. S. C. §33 (1940).

all information contained in it would be made public. The alternative to this procedure, vaguely advocated by those who objected to the provisions actually incorporated in the Act, was to establish a category of permanently secret patents. This concept is so obviously absurd—one need only imagine the confusion which would be generated whenever "secret" patents became the subject of litigation—that it never received serious consideration in Congress. The issue was clearly defined and could not be compromised. Congress had to decide whether to protect property rights embodied in patents at the expense of national security, or to protect national security at the expense of patent rights.

The House of Representatives was so stalwart in its defense of property rights that at one stage in its deliberations it adopted as a substitute for the patent provisions passed by the Senate a series of provisions, prepared by the ranking majority member of the Patents Committee of the House, which omitted any reference whatever to the need for secrecy in certain types of atomic energy devices, and created no machinery to provide it. This ready willingness to waive the need for secrecy where it impinged on the institution of private property provides an interesting contrast to the zeal with which the House voted the death penalty for unauthorized dissemination of "restricted data."

The House had perhaps been impressed by the example set by the officials of the Manhattan District. Seldom have the military guardians of our national security so convincingly demonstrated their whole-hearted and uncritical loyalty to the institutions of our system as in their devoted adherence to the ritualism of patent procedures during the development of the atomic bomb. A brief but impressive demonstration of this loyalty is provided in the testimony before the Senate Special Committee of one Captain Robert A. Lavender, U.S.N., Retired, Chief Patent Adviser to the Office of Scientific Research and Development. Captain Lavender, having revealed that there were patents on file covering every detail of atomic energy development, immediately soothed the fears of the senators by assuring them that these patents had had "special handling," that no more than a few people were acquainted with their contents, and that the patents were kept "in separate safes" in the Patent Office. The senators were particularly perturbed as to the status of the data on the atomic bomb itself. Captain Lavender reassured the Committee that the economy was safe, that infringement suits against the government need not be feared, "that the bombs are covered by applications." But the Chairman, Senator McMahon, persisted in his puzzlement. "I wonder," he asked, "what is the necessity for covering the bomb itself by applications for patents." Captain Lavender replied cogently: "Well, it is very important for this reason: I knew that as soon as the bomb went off there would be a great deal of speculation among various scientists and others, engineers, who had not been connected with the project. I knew that a great many applications would be filed in the Patent Office, so I was interested in having filed in the Patent Office these applications, so that if any applications were

filed and we got into interference, the Government would not be suffering the handicap of being the second one to file, because the first to file has a great advantage from an interference procedure point of view."[6]

Neither the Chairman nor Senator Millikin felt that this entirely met the causes of their disquiet, nor did Captain Lavender's disclosure of "another special handling"—a kind of special, special handling—for atomic bomb applications convince the Committee that the secrets had been as zealously guarded as the Government's legal rights. However, there can be little doubt that any private person who built an atomic bomb would be infringing on the property of the people of the United States, and liable to a civil suit.

In the end, the Senate provisions were accepted, and the patent section as enacted emerged radical and untempered. While taking meticulous care that no property rights should be modified without adequate compensation, and that future discoveries and inventions should be suitably rewarded, Section 11 revokes all patent rights, present and future, which might endanger the security of the country or interfere in any manner with the full development of atomic energy—both in its military and non-military applications. Where the privileges of the patent system seemed to hold a threat to the national security, they were altogether abandoned. Where there was doubt that patents issued in the field of atomic energy would serve as a spur to inventive genius and contribute to development, and the possibility existed that such patents might be used to stifle development or to strengthen monopolistic practices, the system was modified. The resulting provisions make a unique pattern among American institutions. All patents are abolished in certain areas monopolized by the government, and sweeping government control is established in all other parts of the general field. The Atomic Energy Commission, under the policy directives of the Act, is required to use these powers to promote private enterprise, to develop and utilize atomic energy, and to strengthen free competition. Coupled with these policy objectives, Section 11 can be interpreted as a recognition of the fact that, as it normally operates, the patent system does not inevitably generate these results, and that at least in the field of atomic energy, if they are to be realized, powerful and continuing assistance may be required.

The atomic energy control system is complicated because the Act distinguishes sharply among the types of activities in the field, and attempts to apply to each activity a control no more drastic than its character requires. The major divisions of activity in the field of atomic energy were established as follows: transactions involving source materials; the manufacture of devices for the production of fissionable material; the production of fissionable material; the production of military weapons utilizing fissionable material or atomic energy; the utilization of fissionable material or atomic energy for medical therapy; the utilization of fissionable material or

[6] *Hearings before Senate Special Committee on Atomic Energy on S. 1717*, 79th Cong., 2d Sess. 345-347 (1946).

RELATION BETWEEN LICENSING AND PATENT PROVISIONS APPLICABLE TO DEVICES

CATEGORY	DEFINITION: SUB-CATEGORIES	MANUFACTURE AND/OR USE	PATENTS
I. Production devices	I.		

Relation Between Licensing and Patent Provisions Applicable to Devices

Category	Definition: Sub-categories	Manufacture and/or Use	Patents
I. Production devices for fissionable material	I. A. Production facilities proper (probably essential devices) 1. Useful solely for this purpose 2. Multiple-use B. Devices used in production, but not production facilities proper 1. Useful solely for this purpose 2. Multiple-use	I. A. 1. Manufacture by licensees only; use controlled by limitations on production of fissionable material 2. Manufacture by licensees only; no restriction on non-atomic energy uses* B. 1. No restriction on manufacture; use controlled by limitations on production of fissionable material 2. No restrictions on manufacture or non-atomic energy uses	I. A. 1. Revoked in full §11(a)(1) 2. Revoked with respect to atomic energy uses† §11(a)(2) B. 1. Revoked in full §11(a)(1) 2. Revoked with respect to atomic energy uses† §11(a)(2)
II. Military devices utilizing fissionable material or atomic energy	II. A. Military weapons (probably confined to finished weapons or essential components) 1. Useful solely for this purpose 2. Multiple-use B. Devices used in utilization of fissionable material or atomic energy for military weapons, but not weapons proper 1. Useful solely for this purpose 2. Multiple-use	II. A. 1. Manufacture with Commission's permission only; use by government 2. Manufacture with Commission's permission only B. 1. No restriction on manufacture; use by licensees only 2. No restriction on manufacture or non-atomic energy uses	II. A. 1. Revoked in full §11(a)(1) 2. Revoked with respect to atomic energy uses† §11(a)(2) B. 1. Revoked in full §11(a)(1) 2. Revoked with respect to atomic energy uses† §11(a)(2)
III. Research	III. Any inventions or discoveries inside or outside field of atomic energy which are used in research or development in atomic energy	III. No restrictions on manufacture or use	III. Revoked, to extent invention or discovery used in research and development in field of atomic energy §11-(b)
IV. Non-military utilization devices	IV. A. Non-military utilization devices proper: 1. Industrial and commercial (1) useful solely for this purpose (2) multiple-use 2. Medical therapy B. Devices essential to utilization, but not utilization devices proper	IV. A. 1. (1) Manufacture and use by licensees only (2) Manufacture by licensees only, no restriction on use for non-atomic energy purposes 2. No restrictions on manufacture or use B. No restrictions on manufacture or use	IV. A. 1. Patents covering such discoveries can be declared affected with public interest, and thereby made available to any license holder under Sec. 7 of the Act (covered by column 3 of this table) to extent required for carrying out purpose of license† §11-(c) 2. No provision—undoubtedly an oversight in drafting. Medical devices can be patented, and patent rights in no way modified except that such patents are subject to the Commission's condemnation powers. B. (Same as (A) above)

* Considerable latitude is given the Commission in defining production facilities. In the case of multiple-use devices where no security considerations are involved and the uses outside the field of production of fissionable material are extensive or important, the Commission will probably exclude the device from the classification.

† Also subject to condemnation powers of Commission. §11(d).

atomic energy for commercial and industrial purposes; and research and development on any of the above, as well as in nuclear processes and the theory of atomic energy. The breakdown of functions for purposes of the system of patent controls is somewhat less complex; but the categories established roughly parallel those of the general control system. Together, the patent provisions and controls serve as integral parts of one general system, as will be seen in the chart on page 749, which summarizes much of the material in this paper.

I

DEVICES USED IN PRODUCTION OF FISSIONABLE MATERIAL AND MILITARY WEAPONS

A. Single-Use Devices

The Act prohibits the patenting of any invention which is "useful solely in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon."[7] Patents of this description now in force are expressly revoked, with the proviso that "just compensation shall be made therefor."[8] Here, as in the establishment of a production monopoly for fissionable material and of information controls, there is clearly shown the determination of Congress to preserve at any cost the safeguards deemed necessary for national security. In this instance the subject matter to be safeguarded is the data of nuclear physics and nuclear engineering. Only by removing from the normal routine of the patent system inventions and discoveries incorporating such data can the information be kept, even briefly, in a restricted status.

While the scope of this section seems extremely sweeping, its practical implications should not be exaggerated. Under other provisions of the Act the inventor of a production device could not, were he able to secure a patent, manufacture the device without a license from the Commission, or utilize the invention himself, or license its use to anyone other than the Government. Since he is assured of a reward commensurate with the novelty, utility, and importance of his invention under the compensation provisions, the denial of patent rights should for him have little more than semantic significance. This is particularly true since, under an existing statute,[9] the inventor of a device desired by the Government for its own use can neither withhold it from the Government nor even fix the royalty, which is determined by the Court of Claims.

Similar principles hold for devices useful solely in the utilization of fissionable material or atomic energy for a military weapon: the device cannot be manufactured except with the express authorization of the Commission; the Government alone is authorized to use an atomic energy weapon; adequate compensation will be paid to the inventor for any useful military device. Under these circumstances, to deny the inventor patent rights is to deprive him of nothing of practical value.

[7] 60 STAT. 768, 42 U. S. C. A. §1811(a)(1) (Supp. 1946).
[8] 60 STAT. 768, 42 U. S. C. A. §1811(a)(2) (Supp. 1946).
[9] 36 STAT. 851 (1910), as amended, 35 U. S. C. §68 (1940).

The discussion so far has been confined to the inventions and discoveries of the future. Many private patents, embracing devices and processes basic to the production and use of fissionable material, were, however, granted before the adoption of the Atomic Energy Act. According to testimony before the Senate Special Committee, all of the principal inventions for which patent applications were filed were assigned to the government.[10] Whether or not the public interest in this project, financed entirely at public expense, was in fact so scrupulously served is known for certain only to the select fraternity who were made cognizant of the contents of Captain Lavender's "separate safes" at the Patent Office. In any event, all outstanding private patents are automatically revoked by this subsection, and the appearance or non-appearance of claims for compensation will constitute the best evidence on the subject.

How is a manufacturer (and patent owner) of a presently existing device for the production of fissionable material (or for its utilization in a military weapon) affected? To begin with, it should be recalled that the manufacturer of a production facility (or an atomic weapon) cannot continue such manufacture without a license from the Commission.[11] If he receives a license, he may continue to produce the device for the use of the Commission even though his patent rights are revoked. Revocation of the patent rights, however, permits the Commission at its discretion to license other manufacturers to produce the same device. Presumably, in determining the compensation to be awarded to the patentee the number of such licenses will be considered. In other words, the amount of royalties the inventor could have earned by licensing or otherwise, had his patent not been revoked by this subsection, is the main factor to be weighed in fixing his compensation.

B. Multiple-Use Devices

The treatment under the Act of inventions useful *solely* in the production of fissionable material or military weapons is a relatively straightforward matter. Inventions with multiple uses—*i.e.*, useful both in the field of atomic energy and in other fields—present a more difficult problem. Section 11(a)(2) revokes every patent on an invention or discovery having multiple uses *"to the extent that* such invention or discovery is used in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon."[12] Just compensation is also required for patents partially revoked pursuant to this section.

Complicated problems will certainly arise in determining when a device is "used in" the production of fissionable material. The sub-section in question contains no qualifying language and may be construed to cover every possible tool, machine, process, etc., which is or could be used to keep the Oak Ridge or Hanford installations in operation. The device need not be "specially designed" (*cf.* com-

[10] *Hearings* cited *supra*, note 6 at 342.
[11] 60 STAT. 759, 42 U. S. C. A. §1804(e) (Supp. 1946).
[12] 60 STAT. 768, 42 U. S. C. A. §1811(a)(2) (Supp. 1946).

ponents of production facilities—Section 18(g));[13] it need not be "peculiarly adapted" (*cf.* utilization equipment—Section 18(f));[14] it need not be "essential" for the production of fissionable material (*cf.* condemnation authority—Section 11(d)).[15] Whether the patent covers a stepladder, a hammer, a pump, an electrical transformer, a cyclotron, a chemical process, or an industrial design for supporting concrete flooring; whether or not the device (or process) is peculiarly useful or essential in the production of fissionable material—all of these factors are immaterial if the device is in fact used in such production.

Here again, its scope is a poor guide to the section's practical applications. Consider, for example, the case of high-vacuum pumps. These pumps, useful in certain phases of isotope separation, are also useful in other industrial processes. As sole producer of fissionable material, the Commission will probably buy the pumps rather than make its own. Most likely it will procure them from the patentee or one of his licensees. But since patent rights in the pump are revoked in so far as it is employed in the production of fissionable material, the Commission may purchase pumps from other manufacturers licensed by it. Research institutions in this field may also buy pumps from these other manufacturers if the Commission licenses them. Unless the Commission grants a license under Section 4(e),[16] no manufacturer may take advantage of the partial patent revocation. As a matter of practice, the Commission will probably do so only when there is a real object to be served in so doing. The determination of just compensation in cases involving partial revocation is likely to prove difficult and vexatious, and the Commission will hardly undertake to buy from a manufacturer not authorized under the patent without reason.

II

DEVICES USED IN RESEARCH

In the treatment of patents there is accorded to research the same status of privilege which it enjoys throughout the Atomic Energy Act. Section 11(b) emancipates from the scope of the patent system "any invention or discovery to the extent that such invention or discovery is used in the conduct of research or development activities in the fields specified in Section 3." This section, it will be recalled, embraces all research in nuclear science and in the many fields—medicine, engineering, chemistry—applying the knowledge gained through nuclear explorations.

Existing patents are revoked "to the extent" the inventions they cover are used in research; patents "granted hereafter" confer no rights as regards use in research; just compensation is to be made for every partial revocation of an existing patent.

The general purposes of this section are three: one, to permit the use of apparatus in the conduct of research free of patent restrictions and characteristic patent abuses;

[13] 60 STAT. 774, 42 U. S. C. A. §1818(g) (Supp. 1946).
[14] 60 STAT. 774, 42, U. S. C. A. §1818(f) (Supp. 1946).
[15] 60 STAT. 768, 42 U. S. C. A. §1811(d) (Supp. 1946).
[16] 60 STAT. 759, 42 U. S. C. A. §1804(e) (Supp. 1946).

two, to permit research workers to construct their own apparatus without fear of infringing on existing patents and without being forced to seek licenses or pay royalties; three, to encourage, or at least to remove obstacles to, the improvement of existing scientific apparatus by rendering less profitable the expedient of suppressing inventions.

To clarify the meaning of this subsection it will be necessary to consider two types of devices: those which fall unambiguously in the class of scientific instruments, useful solely for research; and those which are used in experimental work but serve other purposes as well.

The cyclotron may be taken as an example of the class of scientific instruments useful solely in nuclear research. Assume that *A* holds patents on a certain type of cyclotron, and manufactures it for commercial distribution. It is not to be inferred that the patents held by *A* are automatically revoked as they would be if the device which they covered were, for example, useful solely in the production of fissionable material. The patentee retains the exclusive right to make, sell or use the cyclotron for any purpose other than atomic research. But there is a partial revocation of *A's* patents with the following consequences:

(1) It is permissible to make[17] a replica of *A's* product, for use in one's own research, without infringing *A's* patents;

(2) It is permissible to make a replica of *A's* product (or to purchase one of his cyclotrons) for the purpose of redesigning or improving the instrument itself. In other words, *A's* cyclotron may be used as a subject of research, as distinguished from a tool in the course of research, and this activity also may be conducted independently of *A's* patents rights. It should be noted that under the well-established legal doctrine of "experimental use," the reproduction of a patented device for the purpose of experimenting on the device itself is not deemed a patent infringement. But judicial decisions in such cases are neither uniform in reasoning nor consistent in result, particularly in actions for patent infringement where the defendant has been found to be experimenting with a "commercial incentive." Such crevices of uncertainty seem to be sealed by the language of the Atomic Energy Act. Since subsection 3(a)(2) provides for research on "processes" and "devices," and since the present subsection (11(b)) covers the use of inventions in the course of the research described in Section 3, there can be no doubt that the "incentives" of the research worker have no bearing on his exemption from patent restrictions.

(3) It is not permissible either to manufacture a replica of *A's* product for, or to sell such a replica to, a person who will use it in research, even nuclear research.

There remains for examination the class of multi-use devices in the field of nuclear research. Here again, the principles noted with respect to multi-use devices in production and in military weapons apply. Consider, for example, the case of a

[17] The law reads: "to the extent that such invention or discovery is used in the conduct of research." Strictly, "use" may be distinguished from "make," but the intent to free atomic research from a patent owner's unwillingness to make or sell his invention would be thwarted if this interpretation were not adopted.

manufacturer of a patented electrical transformer which, in addition to certain industrial uses, is valuable for research in the chemistry of plutonium. So far as this provision is concerned, he continues to hold his patent rights against all users except those using the transformer in the course of nuclear research.

Compensation, it will be noted, is provided only for partial revocation of *existing patents*. Future patents confer no rights with respect to inventions used in the conduct of research. Determination of such compensation is not likely to prove too troublesome. While scientists may build their own apparatus, in practice they, or the institutions with which they are affiliated, will probably continue to purchase the instruments needed for research from the manufacturer, who, in turn, is the patent owner or a licensee. With compensation dependent on "actual use,"[18] neither the volume of cases nor the size of awards is likely to be substantial.

It should be remarked, however, that the term "development" is broader than research, including, as defined in the Act, the extension of investigative findings and theories "into practical application for experimental and demonstration purposes."[19] The use of inventions in the conduct of research and development, free of patent rights, means something more than the use made by the occasional scientist tinkering or building his own tools in the laboratory. It means that industrial laboratories engaged in large-scale nuclear research—the production of atomic power, for example—can build all their facilities and apparatus without regard to outstanding patents. This may require substantial "partial revocation" awards to holders of patents existing at the time the Act went into effect.

III

NON-PRODUCTION AND NON-MILITARY DEVICES

In treating patents on devices of significance in the field of atomic energy, other than production or military devices, Congress sought to preserve the basic right to patent while eliminating the more glaring abuses which have come to mark the system.

Such devices may be of two sorts: (1) they may utilize fissionable material or atomic energy for industrial, commercial, therapeutic, or other purposes, or (2) they may be altogether outside the field of atomic energy but nevertheless essential to the utilization of fissionable material or atomic energy. For the sake of convenience, we shall hereafter refer to devices of the first sort as "ordinary atomic energy devices," and to those of the second as "ancillary devices."[20]

Manufacture of the ordinary atomic energy device will require a license issued by the Commission pursuant to the provisions of Section 7 of the Act. But the Act

[18] 60 STAT. 768, 42 U. S. C. A. §1811(e)(3) (Supp. 1946).

[19] 60 STAT. 774, 42 U. S. C. A. §1818(e) (Supp. 1946).

[20] It is impossible for a layman to say with any certainty just what an ordinary atomic energy device might be. The reader is at liberty to conjure up his own private marvels, but to give aid to those whose imaginations do not respond immediately to this stimulus, we suggest as a plausible device a small reactor, burning nuclear fuel, which would be used to propel a ship.

requires of the Commission an interest in the ordinary device which extends greatly beyond the mere licensing of its production. It is charged with the carrying out of a declared policy which will assure that "the development and utilization of atomic energy shall, so far as practicable, be directed toward improving the public welfare, increasing the standard of living, strengthening free competition in private enterprise . . .";[21] it is required to administer "a program for government production, ownership and *use* of fissionable material . . . to insure the broadest possible exploitation of the fields."[22] To effect these policies, the Commission will need to maintain a firm and continuing supervision over ordinary atomic energy devices, and to make certain that patents on devices essential to the utilization of atomic energy shall not be permitted to obstruct developments.

When the patent application on the ordinary device is filed, the Patent Office will notify the Commission. In the case of ancillary devices, the probability is that the initiative in securing a declaration that a patent is affected with public interest will be taken by some licensee who finds that his operations are being hampered by his inability to use the device in question. In any case, the Patent Commissioner is required to provide the Commission access to applications filed. The Commission may, if it thinks the situation warrants, declare a patent in either category—that is, covering an ordinary atomic energy device or an ancillary device—"affected with the public interest." The making of this declaration has the following effects:[23]

(1) The Commission is automatically licensed to use the device covered by the patent "in performing any of its powers under the Act";

(2) Any person to whom a license has been issued under Section 7 is authorized to use the patent declared so affected to the extent the invention it covers "is used by him in carrying on the activities authorized by his license under Section 7."

What circumstances make it the "duty of the Commission to declare any patent to be affected with the public interest?" Section 11(c)(1) sets forth these criteria: (1) "the invention or discovery covered by the patent utilizes or is essential in the utilization of atomic energy"; and (2) the licensing of the invention or discovery under this subsection "is necessary to effectuate the policies and purposes" of the Act.

Any invention which is covered by the definition of an "ordinary atomic energy device" meets the first condition. But an ancillary device which does not utilize fissionable material may also be included so long as it is "essential" in such utilization. What is "essential?" Presumably, it is a device or component indispensable to the functioning of some other device which utilizes atomic energy. In medieval times a kingdom was allegedly lost for want of a nail; in our interdependent technology a gigantic war machine almost came to a halt because of a shortage of special one-inch aircraft screws.[24] In the air war against Germany the planners

[21] 60 STAT. 755, 42 U. S. C. A. §1801(a) (Supp. 1946).
[22] 60 STAT. 755, 42 U. S. C. A. §1801(b)(4) (Supp. 1946).
[23] 60 STAT. 768, 42 U. S. C. A. §1811(c)(2) (Supp. 1946).
[24] The famous wartime bottleneck involving the product of Jack and Heinz Precision Industries, Inc., Cleveland, Ohio.

agreed that ball bearings were essential to the whole economy and that ball-bearing plants must have first priority as targets. These examples are cited to show that "essential" as used in the text is essentially undefinable. It is likely that the Commission will first decide whether the licensing of an invention "is necessary to effectuate the policies and purposes of this Act"—the second condition, to which we shall turn in a moment—and, if this is decided affirmatively, then determine whether the invention is actually "essential." On occasion it may be necessary to adopt the tactics of Procrustes.

As for the second condition—that the licensing of an invention must be found "necessary to effectuate the policies and purposes of the Act"—this seems to confer upon the Commission a very broad discretion. It is clearly designed to empower the Commission, on broad social or economic grounds, to liberate any or all devices needed in the development of atomic energy from the coils of the patent system.

This section confers on the Commission sweeping powers to avoid and remove obstacles to the positive development of atomic energy in accordance with the constructive purposes of the Act. There is, however, one gaping omission which must be attributed to a flaw in draftsmanship. This is the failure to make any provision whereby the benefits of atomic energy developments in medical therapy can be made freely available. In their anxiety to provide maximum freedom for medical use of atomic energy, the legislative draftsmen exempted this category from the licensing provisions of Section 7. In drafting subsection 11(c), they provided that all patents declared affected with the public interest might be used by any person holding a license under Section 7. This exclusion of medical therapy was nowhere else corrected. Thus we have the interesting result that the use of a patent to extort unreasonable profits in, say, the utilization of an atomic energy battery is effectively prevented, but the inventor of an atomic energy device useful in the treatment of cancer is free to patent the device, and make such charges for it as the traffic will bear. If abuses develop in this field, it may be necessary to remedy this flaw by legislative amendment.

The powers of the Commission derived from subsection 11(c) must be regarded in conjunction with its licensing powers under Section 7. Together they form a single instrument of single purpose, namely, to promote the usefulness of atomic energy in the public interest. Materials, facilities, and scientific manpower are all limited. Within the bounds of its authority the Commission must, in effect, allocate resources to meet competing requirements. A system of priorities based on a policy reflecting the principal objectives of the Act must govern the allocations. The authority to license the manufacture of atomic energy devices is an integral part of any allocation policy. The complement of this authority is the authority to compel the licensing (and to fix royalties) of patents covering devices needed for such manufacture.

Without this compulsory licensing provision, the holder of a patent on an ordinary atomic energy device or an ancillary device might be in position to prevent

altogether the manufacture of some device—or even a number of devices—duly licensed by the Commission under Section 7. For the patented device might be an essential component of the other, and if the patent holder refused to license the use of his device, or demanded excessive royalties, the manufacturer licensed under Section 7 could get no relief. Thus the owner of a patent covering a device uniquely essential to the manufacture of several types of atomic energy devices could dominate the industry by the appropriate manipulation of his licensing power.

Compulsory licensing does not represent a startling innovation in the patent system of capitalist countries. A statute incorporating such a principle has been in force in the United Kingdom since 1883,[25] and a similar Act has been repeatedly urged in the United States during the past half century.

Proposals for compulsory licensing in the United States, however, have always been most bitterly opposed by the beneficiaries of the present system, since to remove the power to strangle competition is considerably to diminish the economic significance of patents. In the discussions of the patent section of the Atomic Energy Act in Congress, the compulsory licensing feature was the object of the most vehement attacks—some of them bordering on hysteria. A former assistant patent comissioner, for example, warned the House Military Affairs Committee that the patent section of the Act was copied directly from the Constitution of the U.S.S.R. —with minor changes to allow for the difference in idiom. The sensation created by this revelation was only slightly mitigated by the fact that the provision had been drafted by an eleven-man blue ribbon Senate Committee and had been adopted unanimously by the United States Senate.

IV

PROCEDURES FOR REPORTING PRODUCTION DEVICES AND MILITARY WEAPONS

With certain vital areas of nuclear technology in the non-patentable zone, the Commission instead of the Patent Office becomes the central agency to which inventors operating in these areas apply. Section 11(a)(3) covers the point adequately as follows:

(1) Any inventor or discoverer of a device or process useful in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon must file with the Commission within a specified time a detailed description of the device or process;

(2) The time specified is sixty days after the enactment of the Act (September 30, 1946) in the case of inventions and discoveries previously made, and, in the case of new inventions or discoveries, not later than the sixtieth day after such invention or discovery. This completion date is unavoidably a vague concept, and the Commission will probably be required to interpret it afresh in each new case arising under this subsection. The essential consideration should be the good faith of the inventor in reporting his accomplishment as soon as he has reason to believe it

[25] Patents, Designs & Trade Marks Act, 46 & 47 VICT. c. 57, §22 (1883).

workable and useful. The Commission's general inspecting activities in the field of atomic energy projects, and its authority to require periodic reports, should considerably simplify the enforcement problem in this field.

Since nuclear research and engineering is a new field, largely shrouded by security regulations, it may be expected that for some time to come inventions or discoveries will be made which will have significance for the production of fissionable material or for its utilization for a military weapon, without the inventor's being aware of the fact. In order to provide for this possibility, subsection 11(a)(3)(c) authorizes the inventor unaware of the significance of his invention to file application for a patent in the usual way, or, in the event he has not made such application, to file a report within sixty days after he first discovers or has reason to believe that his invention falls into the category established by this subsection.

Great skill will be needed for the effective enforcement of the provisions of this subsection. The Commission must have prompt and detailed reports on all new developments in atomic energy, in order to conduct its production and research programs, and it cannot assume that the provisions cited will automatically produce this result. The willing cooperation of the inventor must be enlisted; otherwise he can pretend that the invention is not yet "completed," or that he is unaware of its importance to atomic energy. Everything possible must be done by the Commission to correct misapprehension, wilfully cultivated by some of the opponents of the patent section, of the effect of these provisions, and to demonstrate that the Act neither destroys the patent system nor takes away the inventor's property without compensation. The examination of reports on new inventions, and the making of compensatory awards where the usefulness of the invention justifies compensation, should be accomplished with a minimum of "bureaucratic" delay. If it becomes recognized that the efficiency of the Commission in processing reports compares favorably with analogous procedures performed by the Commissioner of Patents, and that the compensation awarded inventors is based on a fair, consistent and comprehensive policy, cooperation will be readily forthcoming. Admittedly, the determination of awards will be among the most difficult functions to be performed by the Commission; but this is merely to say that the task merits extraordinary effort.

V

COMPULSORY LICENSING AND ROYALTIES

The Commission has authority to compel the licensing of patents, and thereby it can check the growth of monopoly and encourage competition in this new field. A provision for compulsory licensing requires a provision controlling royalties to complement it, for otherwise the patent holder could peg royalties at a prohibitive rate.

The Act meets this point by providing that "the owner of the patent shall be entitled to a reasonable royalty fee" which may be agreed upon by the owner and

licensee (under Section 7). But if they are unable to reach an agreement the royalty rate is to be determined by the Commission.[26]

Supplementary support for the compulsory licensing and royalty fixing mechanism is provided in Section 11(c)(3). The principal features of this section are as follow:

(1) No court may enjoin a licensee, under Section 7, from using a patented invention declared to be affected with the public interest under Section 11(c)(1). While the licensee is automatically entitled to use such a patented invention, it will be recalled that he may do so *only* "to the extent such invention or discovery is used by him in carrying on the activities authorized by his license. . . ." Presumably, therefore, if the patented invention is used for purposes outside the scope of the license, a court of competent jurisdiction would *not* be prohibited from issuing an injunction in an action for infringement by the patent holder;

(2) Assume the court finds that the defendant licensee is actually using the patented device, but royalties have neither been agreed upon nor determined by the Commission. This circumstance might arise either where the licensee is unaware of the existence of a patent on the device used by him, or where, in his opinion, he is not actually infringing the patent. In that case the court shall "stay the proceeding until the royalty fee is determined pursuant to this section." The measure of damages, once the royalty is determined, is the royalty fee, "together with such costs, interest, and reasonable attorney's fees as may be fixed by the Court";

(3) Where royalties have been fixed by arrangement between the parties or by the Commission, and a licensee then fails to pay, "the patentee may bring an action in any court of competent jurisdiction" for his royalty fee, costs, etc.

VI

POWER TO REQUISITION AND CONDEMN PATENTS

In addition to the patent revocation and compulsory licensing authority, the Commission, under subsection 11(d), is authorized to purchase, take, requisition or condemn any invention or discovery useful in the production of fissionable material, useful in the utilization of atomic weapons, or which "utilizes or is essential in the utilization of fissionable material or atomic energy," as well as patents or patent applications covering such inventions or discoveries.

The scope of this authority parallels that of subsections 11(a) and 11(c). Thus patents on multiple-use production devices, military weapons, and utilization devices, only partially revoked or restricted by the provisions already discussed, may be wholly taken over by the Commission in the exercise of its condemnation power. It is also worth noting that while medical patents are not subject to compulsory licensing, they are nevertheless subject to condemnation as patents on inventions utilizing fissionable material or atomic energy.

This too is an innovation in governmental powers as regards patents, but it

[26] 60 STAT. 768, 42 U. S. C. A. §1811(c)(2) (Supp. 1946).

forms a logical supplement to the Commission's general authority in this field. It enables the Commission to deal speedily and effectively with uncooperative patent owners. It provides an instrument which may prove useful in protecting the national security. It is possible, for example, that multiple-use inventions useful in the production of fissionable material or in certain ordinary atomic energy devices might incorporate data which it is determined on security grounds should be restricted. Under its broad acquisition authority, the Commission could take over the inventions and patents and safeguard them until the data they incorporated has been removed from the restricted category. Since just compensation must be made in every case, and all awards, as will be seen below, are subject to court review, the property rights of patent owners are adequately protected.

The Commissioner of Patents is required to notify the Commission "of all applications for patents heretofore or hereafter filed" which in his opinion disclose an invention or discovery of the type which the Commission is empowered to acquire—that is, atomic energy devices of virtually every type. The Commissioner of Patents is also required to provide the Commission access to all such applications. While this provision is essential to the Commission's discharge of its function of acquiring patents, it is of considerable importance to the performance of certain other functions of the Commission as well. It provides the Commission with an invaluable source of information as to new technological developments, information useful in its research, engineering, and production programs, and should be useful as a supplementary check on monopolistic trends and in the enforcement of security controls. At every stage of the development of the applications of atomic energy, problems will arise jointly affecting the responsibilities of the Commission and the Patent Office. It is clear that the cooperation between these two agencies must not be limited to the formalism of the reporting provision of the present section, but must be vital, close, and continuous.

VII

COMPENSATION

A. Eligibility

Applications for compensation for patents wholly or partially revoked or for the establishment of royalty rates are to be considered by a Patent Compensation Board consisting of two or more employees of the Commission. Final determinations are subject to the approval of the Commission. The draftsmen of the Act made an earnest endeavor to set forth, as guides for the Commission, a framework of standards from which a coherent compensation policy might be evolved. Nevertheless, the Commission is certain to find performance of its functions in this area difficult and vexatious.

Before examining these standards it may be useful to list the classes of applicants eligible for awards:

1. The owner of a patent for production of fissionable materials or military

weapons, or which is useful in atomic energy research, may apply for just compensation;[27]

2. The owner of a patent declared affected with the public interest may apply for the "determination of a reasonable royalty fee" for the use of his patent, or a licensee under Section 7 may apply for the same purpose;[28]

3. The owner of any invention or discovery, or of any patent covering such discovery, which is taken by the Commission may apply for just compensation;[29]

4. Any person making an invention or discovery useful in the production of fissionable material or in the utilization of fissionable material or atomic energy for a military weapon, and whose patent rights have been limited or abolished by subsection (a), may apply for an award.[30]

This review of eligible persons reveals that *every* inventor of a device useful in the technology of atomic energy is eligible, according to circumstance, either for an "award," "just compensation," or "reasonable royalties."

B. Standards for Determining Compensation

The categories of persons entitled to compensation under the Act having been examined, there remain for consideration the standards which are established for the guidance of the Commission in making its findings. As set forth in subsection 11(e)(3), these standards are first described for the determination of royalties, and are then applied in toto to other types of compensation cases, supplemented by consideration of the actual use of the invention or discovery in question. An analysis of the provisions of this subsection follows.

In determining a "reasonable" royalty fee, the Commission is instructed to "take into consideration any defense, general or special, that might be pleaded by a defendant in any action for infringement. . . ." This, in effect, restates a general operating principle in patent law, often invoked in determining compensation to be paid patent owners whose inventions are used by or for the government without their consent. In other words, when the Patent Compensation Board weighs a claim for royalties on a patent, it may consider such factors as would have constituted a partial or total defense to a claim for royalties and damages in a court of law, had the same patent been the subject of an action for infringement.

The Commission is further instructed to take into consideration "the extent to which, if any, such patent was developed through federally financed research." This is an apparently unassailable general principle, but one which must be regarded as something less than firmly established for the whole field of federally financed research. The struggle to determine who shall be the beneficiaries of the discoveries and inventions made possible by the expenditure of government funds during the war has already been joined, though so far it has been concealed from public

[27] 60 STAT. 768, 42 U. S. C. A. §§1811(a)(1), 1811(a)(2), and 1811(b) (Supp. 1946).
[28] 60 STAT. 768, 42 U. S. C. A. §1811(c)(2) (Supp. 1946).
[29] 60 STAT. 768, 42 U. S. C. A. §1811(d) (Supp. 1946).
[30] 60 STAT. 768, 42 U. S. C. A. §1811(e)(2) (Supp. 1946).

attention.[31] The Department of Justice wishes the government to retain control of patents on inventions produced by the expenditure of government funds, and to use the licensing of devices covered by these patents as a weapon for combating monopoly. Opponents of this radical and possibly effective means of achieving orthodox but for the most part merely pietistic ends have been vigorously, albeit silently, at work both outside and inside the government. Their chances to achieve their purpose—given the temper of the times—seem better than good. In the Atomic Energy Act, however, the principle is explicitly established. Since the release of atomic energy and its technology were, beyond any possible argument, made possible entirely by the expenditure of public funds, this is by no means a narrow application of the principle.

Thus, it is established that an atomic energy device incorporating scientific discoveries made as a result of the expenditure of public funds, or one developed in a federally financed project, is not to be regarded as private property, requiring the payment of royalties. A manufacturer is entitled to a fair profit for making such a device, but additional compensation in the form of royalties, when there is no risk and perhaps in some cases no originality involved, cannot be justified.

The Commission is required to consider also "the degree of utility, novelty, and importance of the invention or discovery." This is the heart of the valuation problem. Unfortunately it is also the most difficult. An invention to be patentable must be "new" and "useful." Yet these are conditions which, borrowing from the apt jargon of mathematical proofs, are necessary but not sufficient. How new? How useful? Inventions incorporating no more than petty improvements or variations proliferate at an amazing rate. The Patent Office is usually swamped with this species and the Commission may expect the same deluge when the technology of atomic energy has been more fully elaborated.

It should be noted that in attempting to set a price on "novelty" and "utility" no exact analogy is to be found in a hypothetical action for infringement. In an infringement action the damages awarded the patent holder may incorporate a punitive element in addition to the loss of profits sustained by the plaintiff. In determining royalties under the Act, the punitive factor will not be present, except that where royalties were previously fixed and the licensee under Section 7 failed to pay, or where the licensee knowingly infringed on an existing patent, the licensee may be liable for damages and costs in addition. Moreover, the determination of reasonable royalties, on the basis of hypothetical profits which might be derived from the sales (if sales were permitted) of untried devices in an unknown field, presents problems which would tax the powers of a corps of clairvoyants. The Commission must undertake the task aided only by such perception as lawyers, economists, scientists, and businessmen can bring to bear. The onus of demonstrating

[31] However, a real beginning has at last been made in the Attorney General's patent report. See U. S. DEP'T OF JUSTICE, INVESTIGATION OF GOVERNMENT PATENT PRACTICES AND POLICIES, REPORT AND RECOMMENDATIONS OF THE ATTORNEY GENERAL TO THE PRESIDENT (3 vols. 1947).

the novelty and utility of the device must fall on the applicant, and the Commission will probably maintain an attitude of open-minded and judicious skepticism. The task will be most difficult in the early stages, and will become easier with the growth of experience and a body of precedents.

The Commission "may consider the cost to the owner of the patent of developing such invention or discovery or acquiring such patent." This factor was deliberately made optional, for in developing any invention the financial investment may vary from a small sum to an amount out of all proportion to the value of the final product. In the realm of ordinary commercial affairs, where the cost of developing a device has been unduly high royalties can be fixed at a level sufficient fully to cover costs only if the device is of key importance and satisfactory substitutes are not available. Possession of such a device may enable the patent holder to gain a dominating position in the economics of an entire industry. Charged with carrying out the broad social and economic objectives of the Act, the Commission, of course, cannot permit royalties on key devices to be fixed so high that small manufacturers are excluded from the field. In some instances it may be necessary for the Commission to acquire a patent outright in order to accomplish the dual purpose of making the invention it covers widely available, and of compensating the patent holder for costs incurred. When the Commission acquires a patent on a device and makes it available for use by private persons, it may decide to charge a moderate royalty fee sufficient over a period of years to recoup its outlay. The Act does not explicitly authorize this procedure but it is reasonable to infer that it would be justified.

In addition to these provisions, which by guaranteeing fair compensation seek to encourage private invention, the Commission has authority under Section 3 to finance private research projects under appropriate financial arrangements. In consonance with the general policy objectives of the Act, it appears that the Commission should make inventions developed under this arrangement fully and freely available. If this is indeed the policy followed, it is to be expected that industry will normally prefer to finance its own projects except when these involve large expenditures coupled with tenuous prospects of success. Nevertheless, arrangements made under this authority may be very important in contributing to the work of independent inventors who are hampered in their investigations by inadequate funds.

The same considerations apply to the determination of compensation for the various types of patents wholly or partially revoked under subsections 11(a), 11(b), and 11(d), and for the granting of awards authorized by subsection 11(e)(2)(C), to persons not entitled to compensation under the subsections cited. In addition to these considerations the Commission is required to take into account "the actual use of such invention or discovery." The Commission is given discretion to pay the amount decided upon either in a lump sum or in periodic payments.

C. Judicial Review of Compensation

Any inventor or patent owner dissatisfied with the amount or terms of the award or royalty set by the Commission may obtain a judicial review of the Commission's

determination. The procedure to be followed is similar to that established in other regulatory statutes, such as the Federal Trade Commission Act, the Securities Exchange Act, and the Federal Communications Act. The aggrieved person files in the Court of Appeals for the District of Columbia a written petition asking that the determination be set aside. The Commission, upon being served with a copy of this petition, files with the Court a certified transcript of the entire record. The Commission's findings of fact are conclusive if supported by substantial evidence, and the case is decided upon this record, the Court having the authority to affirm the determination of the Commission in its entirety or to remand it to the Commission for further proceedings.

The requirement that the review proceedings be brought in the Court of Appeals for the District of Columbia follows the Federal Communications Act. The facts in these cases will usually be complex and often involve restricted data; limiting review to a single appellate court should serve the double purpose of enabling the court to develop experience in the field of atomic energy and holding to a minimum the number of judges to whom confidential material is entrusted. In reviewing the Commission's determinations the court is governed by the terms of the Administrative Procedure Act, which provides that the only ground for setting aside such an administrative determination is that it is arbitrary, capricious, or not supported by substantial evidence.[32] The Court's decision is subject to further review by the United States Supreme Court if certiorari is granted upon petition of the Commission or any party to the court proceeding.

VIII

CONCLUSION

Upon analysis, this painstakingly fair and even generous section of the Act seems scarcely to merit the extravagant abuse which has been directed against it. The section takes scrupulous care that no rights are infringed without just compensation, and that no future discoveries or inventions in the field of atomic energy shall fail of adequate reward. What it does, of course, is to intrude rudely into certain sanctuaries of the patent system regarded as sacred, not by scientists and inventors, but by practitioners of the art of economic manipulation. The conclusion is difficult to escape that these were the persons offended, and that the aspect of the patent provision which outraged them most was not its failure to make adequate financial compensation for any property rights it impaired, but the simple and efficient way in which it eliminated from a whole vast area of enormous potential economic significance all possibility of manipulating patents as an instrument for achieving privileged position and monopoly control.

[32] 60 STAT. 243, U. S. C. A. §1009(e) (Supp. 1946).

A REEVALUATION OF THE INTERNATIONAL PATENT CONVENTION

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I

With the end of World War II all of the established institutions and practices involved in international relations have been subjected to new scrutiny. Are patents involved in this ferment? Is there need for a "study of the present convention on patents" as recently proposed?[1]

The patent field is one of the very few in which by the end of the last century the interests of the nations were already coordinated by international treaty. This was accomplished in the "International Convention for the Protection of Industrial Property," signed March 20, 1883.[2] This agreement has recently been termed "the most perfect example of a multilateral convention affecting economic matters."[3] Briefly, it binds its members to give to all nationals of member countries: (1) the same treatment accorded their own nationals; (2) a priority period of one year to the applicant in one country for his filing of applications in all other member countries without being exposed to objections based on prior publication, patent application, or use; (3) a patent independent, in time and validity, from patents granted in other countries, particularly in the country where the first application was filed.[4] The parties to the convention agree that a patentee may import goods into their countries without entailing forfeiture of his patent; and they also bind themselves not to issue compulsory licenses for failure to use the patent during the first three years.[5]

The member countries constitute themselves into a "Union for the Protection of Industrial Property," but there is no enforcement machinery. Reliance is placed

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[1] Charter for the International Trade Organization of the United Nations, Art. 41 (b), as drafted at the London Meeting, Oct. 15, 1946, by the Preparatory Committee of the International Conference on Trade and Employment (U. S. Dep't State, Dec. 1946).

[2] REPORT OF THE COMMISSIONERS APPOINTED TO REVISE THE STATUTES RELATING TO PATENTS, TRADE AND OTHER MARKS AND TRADE AND COMMERCIAL NAMES UNDER ACT OF CONGRESS APPROVED JUNE 4, 1898 8, 146 *et seq.* (1902). The convention was concluded at Paris on March 20, 1883. It was revised at Brussels on Dec. 14, 1900, at Washington on June 2, 1911, at The Hague on Nov. 6, 1925, and at London on June 8, 1934.

[3] NATIONAL FOREIGN TRADE COUNCIL, INC., COMMENTS ON THE REVISED CHARTER FOR AN INTERNATIONAL TRADE ORGANIZATION IN TERMS OF FOREIGN ECONOMIC POLICY, PRESENTED AT PUBLIC HEARINGS BEFORE AN INTERDEPARTMENTAL COMMITTEE (Nov. 21, 1947). *Hearings before the Senate Committee on Finance on Trade Agreements System and Proposed International Trade Organization Charter*, Pt. II, 80th Cong., 1st Sess. 997 (1947).

[4] International Convention for Protection of Industrial Property, Arts. II, IV.

[5] *Id.*, Art. V.

upon adherence by the members to their promises, and the effectiveness of general diplomatic representations in the event of violations. The office of the Union—the International Bureau for the Protection of Industrial Property—is limited to the function of collecting and publishing information.[6]

This article deals with the background and with the intended as well as the actual economic consequences of the Union. Recent writings and discussions of patent experts deal largely with judicial interpretations of legal rules of the convention.[7] Certainly the legalistic wording of the treaty does little to suggest anything else. In fact, however, in the building of the Union all vital issues of the modern international patent system have been decided. The convention—and the practices developed under it—are basic to the whole structure of the pre-World War II policy of restriction of economic development in the less industrialized countries and monopolization or cartelization in the more industrialized ones.

II

The United States entered the Union in 1887;[8] Germany, the last industrial power to join, did so on May 10, 1901.[9] As often happens in the history of treaties, the actual decisions were reached before the first country signed. The creative period of the Union was between 1872 and 1881. During this period the negotiations on the international patent convention were the battlefield for three opposing philosophies: (1) the anti-patent movement, aimed at the destruction of the patent system; (2) the recognition of patents as private property; (3) the recognition of patents as an instrument of public policy. Certainly the issue of patents *versus* no-patents had to be disposed of first. The fight on this point marked the first battle between the United States and the newly organized Germany of Bismarck.

The initial invitation for an international conference on patent rights came from the Austrian Government in 1872.[10] The invitation specifically stated, however, that the suggestion came from the United States:

> . . . following a suggestion of the Government of the United States of America, the General Direction of the Universal Exposition intends to unite with the Exposition an International Congress, which shall discuss the question of patent right; should this discussion, as may be foreseen, induce a vote in favor of Patent protection, it will then be the task of this Congress, on the basis of the experience of various countries and the materials collected, to proceed to a declaration of fundamental principles for an International Reform of Patent Legislation.[11]

[6] *Id.*, Art. VI.

[7] 51 TRANSACTIONS OF [BRITISH] INSTITUTE OF CHARTERED PATENT AGENTS 224 (1942-45).

[8] Approved by the President March 29, 1887; proclaimed June 11, 1887.

[9] FESTGABE DES DEUTSCHEN VEREINS FÜR DEN SCHUTZ DES GEWERBLICHEN EIGENTUMS DER ANSCHLUSS DES DEUTSCHEN REICHS AN DIE INTERNATIONAL UNION FÜR GEWERBLICHEN RECHTSSCHUTZ 43 (1902).

[10] Document entitled *Universal Exhibition 1873 in Vienna, International Congress for the Consideration of Patent Protection* (National Archives, Washington, D. C., Records of the Office of the Secretary of the Interior, Patents and Miscellaneous Division, Letters Received Concerning Patents (Box 82)).

[11] *Id.* at 3.

American leadership in the conference was eagerly anticipated by the United States Commissioner of Patents. He wrote to the Secretary of the Interior on May 29, 1873:

> I regard the patent congress to be held at Vienna of the very greatest importance and the world looks to this government for the presentation of matters for consideration and discussion. If the American system can be properly presented before that Congress, discreetly and cautiously sustained with facts and figures, I feel confident that the best results can be expected.[12]

The very fact of American parentage elevated the prestige of the conference. The proposal for international patent protection did not come from the semi-feudal country of Austria, conspicuously lacking in industrial development; it came from the United States, already at the forefront industrially and with the strongest patent system in the world.

The invitation stated the issue between the patent and the anti-patent forces in forthright manner:

> There exists today an antipatent movement which since 1860 has extended too far and the causes of which movement bear, in part at least, too much upon views which are generally acknowledged by the economical progress of our age, to justify at this time as hitherto a partial solution of that problem. The complete abolition of all Patents for inventions, such is the motto of this movement; Patent protection, the maintenance and improvement of the existing Patent law, if possible in simple form, and by international agreement: such is the watchword of the other. The present condition of Patent legislation in the most enlightened and progressive countries shows on which side the majority stands; with the exception of Switzerland and with her, Holland, which recently abolished her Patent law, the legislation of all the other Industrial States today recognizes the protection of Patents as a necessity.[13]

Germany, as the leader of the anti-patent movement, is not mentioned in the invitation, reference being made only to Holland and Switzerland. There is no doubt, however, that it was the larger country which the organizers of the conference really had in mind. As early as 1868 Bismarck, as Chancellor of the North German Federation, had gone on record as hostile to any form of patent protection.[14] On May 10, 1872, the German Parliament discussed, for the first time in the history of the German Reich, the patent problem.[15] There the position of Bismarck was made even clearer. His representative announced that it would not be undesirable "if the Parliament would use the opportunity of the discussion to express itself in favor of the full abolition of patent protection";[16] in Bismarck's opinion, the

[12] Letter of Commissioner Leggett to C. Delano, Secretary of the Interior (National Archives, Washington, D. C., Records of the Office of the Secretary of the Interior, Patents and Miscellaneous Division, Letters Received Concerning Patents (Box 82)).

[13] *Universal Exhibition 1873 in Vienna, International Congress for the Consideration of Patent Protection,* cited *supra,* note 10, at 2.

[14] I JAHRBUCH FUER GESETZGEBUNG, VERWALTUNG UND RECHTSPFLEGE DES DEUTSCHEN REICHS (Holtendorf), 258, 259 (1872).

[15] I STENOGRAPHISCHE BERICHTE, REICHSTAG 1. LEGISLATURPERIODE 3. Session 304 (1872).

[16] III STENOGRAPHISCHE BERICHTE, REICHSTAG 1. LEGISLATURPERIODE 3. Session 198, n. 2.48 (1872).

example of Holland deserved to be copied.[17] However, it was pointed out to the Parliament that public opinion in Germany might be unprepared for the step:

> . . . since only people who have a private interest in patent protection can express their views in public . . . The Society of German Engineers has repeatedly and actively come out in favor of patent protection. However, not all engineers share this opinion; only considerations for influential interests prevent them from expressing their opinion in public.[18]

Thus, in the summer of 1872, the issue was joined. The organizers of the conference were fully aware that, in a competitive business economy, the world could not live half with patents and half without patents. The invitation to the conference sets forth the interdependence among national patent systems in the following classical statement:

> We live no longer in the day of Industrial action, which is strictly confined and is removed from foreign competition, and where slow communication prevents or delays the utilization of inventions. We live at a time of liberal Customs policy; Steam and Electricity have newly united once isolated seats of industry in a way undreamt of; and the mutual exchange of goods shows today a magnitude which a generation ago one could not have imagined. Under such altered relations the Patent granted for an invention in one country becomes in fact a restriction unprofitable and obstructive, if the same invention without limitation or increase in price, becomes in an adjoining country common property. The artisan who in the one country must work with the auxiliary material there patented and therefore dearer in price, will suffer an essential injury as soon as the same material is produced in the other country, not only without restriction, but with a damaging competition. Moreover a continuance of the hitherto antagonistic views and measures would scarcely conduce to the preservation of general harmony; and if, for example, Patent protection were maintained in one country, so as to attract thereby skilled operatives from another, then the danger of disturbance of the International industrial balance might readily be apprehended. Such and similar inconveniences can only be met by the common action of all civilized States, disposed to the maintenance of Patent protection.[19]

The American delegation to the Vienna conference was an able one. The Assistant Commissioner of Patents, J. M. Thacher, headed the group;[20] his experience and knowledge of the United States patent system gave him a leading role in the negotiations.[21] Unlike many American delegations to international conferences, it was also well prepared. M. D. Leggett, Commissioner of Patents, recommended that our representative should:

[17] *Ibid.*

[18] *Ibid.*

[19] *Universal Exhibition 1873 in Vienna, International Congress for the Consideration of Patent Protection,* cited *supra,* note 10, at 2.

[20] REPORT OF THE COMMISSIONERS APPOINTED TO REVISE THE STATUTES RELATING TO PATENTS, TRADE AND OTHER MARKS AND TRADE AND COMMERCIAL NAMES UNDER ACT OF CONGRESS APPROVED JUNE 4, 1898 7 (1902).

[21] Thacher was described by the Commissioner of Patents, who suggested his appointment, as a "man of thorough education, good address, sound judgment and well versed in patent law and the prospects of invention in the useful arts." Letter of Leggett, June 7, 1873, Records of the Secretary of the Interior. (National Archives, Washington, D. C.)

. . . present and explain the American Patent System, calling special attention to—
1. The justice and expedience of granting patents for new and useful inventions to *original inventors,* and to such only.
2. The importance of thorough preliminary Official examination to determine the questions of novelty.
3. The influence of our Patent System upon the industrial interests of the country.
4. The liberal spirit of our Patent Laws towards the citizens of other countries.
In addition, he should press as a matter of justice between nations, that
1. Mere importers should not receive patents.
2. That patents granted in one country to citizens of another, should not be subject to such restrictions as to time and place of manufacture, as to render such patents comparatively worthless.
He of course should be instructed to make no concessions that can be interpreted as abandoning any of the essential features of our system.[22]

Thacher's own report indicates the tenor of the conference. He said:

It was the general, I may say universally expressed, opinion in the congress at Vienna that in order to secure the advancement of the mechanic arts in their own countries and to prevent the emigration of their most skilled artisans, it was necessary to secure a reform in European patent legislation.

Count Andrassy, the premier of the Austrian Government, put it in a very few words during an interview with the permanent committee when he said:

"I look to England and I look to America, and I find that they are the foremost countries of the world in manufactures. I find also, upon examining their laws, that they have the best patent systems in the world.

"Putting these two facts together, I conclude that the one is dependent upon the other, and therefore I am in favor of a thorough reorganization and revision of the patent laws of Austria."[23]

The Vienna conference made this general attitude manifest in its set of resolutions. It declared that the existence of a patent law was a requirement "of all civilized nations"; and foresaw "great injury . . . inflicted upon countries which have no rational patent laws by the native inventive talent emigrating to more congenial countries where their labor is legally protected."[24] The conference endorsed the "English, American, and Belgian patent laws, and the draft of a patent law prepared for Germany by the society of German engineers"[25] (Bismarck's opponents!). One small bone was thrown to the opponents of an air-tight patent system. A recommendation provided:

It is advisable to establish legal rules, according to which the patentee may be induced, in cases in which the public interest should require it, to allow the use of his invention to all suitable applicants, for an adequate compensation.[26]

[22] Letter of Leggett to the Acting Secretary of Interior, June 30, 1873, Records of the Secretary of the Interior (National Archives, Washington, D. C.)

[23] See note 20, *supra.*

[24] Introduction to Resolutions and I (f) of Resolutions of Vienna, reprinted in 1 FOREIGN RELATIONS OF THE UNITED STATES 75 (1873-74).

[25] *Id.* at II (g) of Resolutions of Vienna.

[26] *Id.* at II (f) of Resolutions of Vienna.

Later this resolution was described by one of its drafters as mere propaganda against the enemies of patents.[27]

Thus the Vienna conference was an outstanding American victory, won by a purposeful policy. It is an anticlimax to read in the interdepartmental correspondence that at the last moment the State Department lacked sufficient funds to send an American representative unless he could personally assume a substantial share of the cost of the trip.[28]

Bismarck immediately found himself confronted with a combined attack from within and without Germany. The Society of German Engineers was already hard at work; and now it had the added prestige of powerful support from abroad.[29] Bismarck was forced to retreat. In 1876 he called a committee of experts to study the patent situation.[30] In February, 1877, he submitted a patent bill to Parliament.[31] The eminent Charles Lyon-Caen made the following observations on this development:

> A complete understanding of this important bill depends on an understanding of the principles which motivate the government. The government has never admitted that the institution of patents has anything to do with its ideas of justice. The government does not even seem to be convinced that the patent system actually favors the progress of industry. It suggested the passing of the bill only because Germany cannot stand isolated in the middle of all great nations which have patent statutes. In fact, the government in its memorandum explaining the new step stated: "Germany, resolved to suppress the patent system, could effectively take steps to this end only if other countries were expected to follow. This is, however, more than doubtful; and such a step would certainly result in the complete isolation of Germany for many years."[32]

III

The American victory in the issue of patent *versus* no-patent, decisive as it was, merely transferred the battlefront to the next stage. This was the issue of patents as private property rights as against patents as instrument of public policy. The impending struggle was foreseen in the American-Austrian discussions of 1872. The American Government opened the dispute by complaining against the Austrian principle providing for forfeiture of patent rights if local manufacturing were not begun within one year from the grant of the patent. Here was a clear statement of the issue. John Jay, then American Ambassador in Vienna, pointed out to the Austrian Minister for Foreign Affairs on March 17, 1872:

[27] In the Convention of Paris on Sept. 11, 1878, Dr. Wirth of Frankfurt declared that the Vienna Resolution in regard to compulsory licenses was only a concession made to the enemies of the Patent System. JOURNAL OFFICIEL DE LA REPUBLIQUE FRANCAISE 9187 (1878).

[28] On June 5, 1873, Hamilton Fish, Secretary of State, wrote to Delano, Secretary of the Interior: "You are aware that there is no appropriation at the disposal of this Department wherewith to pay more than the reasonable expenses of the person who may be selected." (National Archives, Washington, D. C.)

[29] Reference is made to II (g) of the Resolutions of Vienna.

[30] Doc. No. 70 of Federal Council (Bundesrat) Sess. of 1876, reprinted in II DRUCKSACHEN TO DEN VERHANDLUNGEN DES BUNDESRATS DES DEUTSCHEN REICHS 64.

[31] 7 BULLETIN DE LA SOCIÉTÉ DE LA LEGISLATION COMPARÉE 98, 102 (1877-78).

[32] *Id.* at 98.

It has been suggested that the differences in the statutes of different countries, in regard to patents, may be generally traced to a difference in the general view taken of the character and position of the patentee; whether he is looked upon as a monopolist who owes all his rights to exceptional law, and who must be jealously watched and severely restricted; or whether he is regarded as a public benefactor, who is to be tenderly and kindly treated. The legislation of Congress has inclined more and more to the latter view; and, while adopting, as the true principle, that the inventor and public are both to be treated rationally, justly, and impartially, its tendency has been to give more and more liberally encouragement and assistance to useful inventors.[33]

John Jay frankly assured Count Andrassy that the President would "cordially embrace this opportunity of cementing the friendship of the two countries and of advancing their common interests by a generous and harmonious policy"[34]—if only Austria would modify its patent law in conformity with the United States statute and would agree to full reciprocity in matters of patents between the two countries.[35]

This American view toward patents was novel. It stemmed from an actual faith that, in a competitive economy, patents under the control of private owners would not be subjected to abuse.[36] The files of the United States Patent Office contain a constant reiteration of this theme; they reveal an absolute faith in the beneficent effects of an uncontrolled patent system.[37] It was precisely this freedom, it was believed, which accounted for the rapid technological advance in the United States.[38] In consequence, the Patent Office violently opposed any kind of govern-

[33] John Jay's note to the Imperial and Royal Minister for Foreign Affairs of March 17, 1872, FOREIGN RELATIONS OF THE UNITED STATES 50-51 (1872).

[34] *Id.* at 52.

[35] *Ibid.*

[36] Here and there some doubts were raised in the faith. At a Senate patent hearing in 1877, Senator Wasleigh said bluntly, "While a man has a right to put his horse into his own barn, and not use it himself, he has no right to lock up his invention and let nobody use it. It is his duty to let his invention go out to the world." The reply of A. H. Walker, patent attorney, is a statement of the dominant American position:

"He has no such duty with reference to the period of his monopoly at all. The only duty he has is to spread the description of the invention on the records of the Patent Office, so that *after* the monopoly has expired, whether it be in fourteen, or seventeen, or twenty-one years, it will be free to the world. He has no duty to publish that invention, or introduce it during the life of the monopoly; and if he chooses to let it die as useless, there is no law or reason why he shall not be permitted to do so. . . . As I understand the theory of the law, it is his *absolute* property during the life of the monopoly and is *not* qualified. Indeed, that is the language of the Constitution itself, viz., that the right is exclusive. . . ." *Arguments before the Committee on Patents of the U. S. Senate and House of Representatives,* Misc. Doc. No. 50, 45th Cong., 2d Sess. 36 (1878).

[37] These files are in the National Archives, Washington, D. C.

[38] At the 1877 patent hearing, J. J. Storrow, patent attorney, testified:

"Sir William Thomson went home from our Centennial Exhibition, and just as he got home he appeared before the British Association, before the section of steam-engineering, of which he is the president, and, in giving them an account of what he had seen in this country, he called their attention very sharply to the effect of patent laws on the improvement of labor-saving machinery. He told them that unless the countries of Europe speedily amended their patent laws, and unless they amended them in a contrary direction to the bill pending in Parliament, they must understand that they would lose their manufacturing supremacy and that Amercia would take it from them. Another gentleman (Mr. St. John V. Day), discussing the pending patent bill quite in detail at the same meeting, declared that, unless they improved their system so as to give more general encouragement to inventors, they would lose their manufacturing supremacy, and with that would give up their commercial supremacy, for that depended on their ability to cheaply supply neutral markets; and, after an interesting discussion, the association resolved that a committee be appointed to procure changes in the law, so that it might be

mental interference—whether against foreign inventors in this country[39] or American inventors abroad. At every opportunity in the correspondence of the patent commissioners with foreign patent offices—through State Department channels or in direct negotiation—the view is developed that only international cooperation and mutual recognition of private property in patents can serve the final aim of the highest technological advance everywhere. The constant reiteration of this gospel by the most highly industrialized country in the world was bound to have an enormous effect.

But such an approach was in direct conflict with established tradition abroad. The American philosophy was genuinely new. True, the speeches of the French Revolution were aflame with this doctrine; Mirabeau exultantly speaks of inventions and patents as private property equal to any other form of private property. But, in fact, the French never drew the logical conclusion from these theories.[40] The patent statute of France after the Revolution provided that patents should be forfeited in the event that patented goods were imported into France.[41] Such a provision was a clear denial of the private property aspect of a patent, and made patents an instrument of public policy to bring manufacturing plants into France. This law still existed at the time of the Vienna conference.

The English patent statute of 1623 had the same purpose. Though usually called the "mother of our patent law,"[42] it differed markedly in aim, method, and field of coverage from our modern patent law. The English statute was a device for bringing new trades into England. Inventions were not new discoveries; trades and skills were "inventions" and patentable if their appearance in England was new. The English documents are replete with instances of the granting of patents for trades imported from the continent.[43] Nor did English patents cover a strictly

more favorable to inventors. The consequence has been, that only last June (1877) the government withdrew their pending bill."

Storrow goes on to quote approvingly the remarks of Hulse, English judge of textile machinery at the Centennial: "As regards extent of invention and ingenuity, the United States was far ahead of other nations. . . . The extraordinary extent of ingenuity and invention existing in the United States, and manifested throughout the exhibition, I attribute to the natural aptitude of the people, fostered and stimulated by an admirable patent law and system, and to the appreciation of inventions by the people generally." *Arguments before the Committee on Patents,* Misc. Doc. No. 50, 45th Cong., 2d Sess. 318 (1878).

[39] On Nov. 8, 1854, Commissioner E. Mason protested to R. McClelland about a suspicion of the American Consul in Paris that foreign applications are handled with bias. He goes on to say, "As an evidence of the truth and sincerity of those statements I refer to pages 16, 17, and 18 of the last Patent Office Reports in which the most unequivocal recommendations will be found in favor of abolishing all discriminations as against foreign applicants and of encouraging inventors from all quarters of the world to place in this Office the Representatives of their genius." (National Archives, Washington, D. C.)

[40] 24 ARCHIVES PARLEMENTAIRES DE 1787 A 1799 636.

[41] *Id.* at 655.

[42] An interesting limitation on this often repeated statement is to be found in the Vienna invitation: "As an object of legislation, its [the patent's] origin extends back to foreign countries as for instance in Great Britain the right of the Crown to the concession of Patents for invention was established by the Acts of Parliament of 1623. But as a matter of controversy, it is scarcely twenty years old, yet notwithstanding its recent date, it already possesses its peculiar history."

[43] Hulme, *The History of the Patent System under the Prerogative and at Common Law,* II LAW Q. REV. 141, 145 (1896).

limited process or product. In fact, just the opposite was true. The patent was granted before the governmental authority even obtained any specification. Not until 1780 did specification become a precondition for the grant of patents; and not until then did the concept of novelty have importance in the field of patents. Thus in the early history of Britain the issuance of a patent was essentially a political; expedient; a temporary monopoly was justified if it brought new trades and skills to the island.[44]

Obviously, the American view expressed in John Jay's letter had nothing in common with the traditional European approach. The question for the Germans —once they had abandoned their original hostility to the patent system—was which view they would adopt. Quite naturally they turned to the early English position. They were newcomers in the industrial hierarchy; they had all of the anti-monopolistic attitudes of the upstart competitor. They immediately adopted the position that patents should not be granted as a matter of right to every inventor, but should be permitted only in those fields in which the public interest justified the grant. Nor were they prepared to look upon patents as private property, to be granted to outsiders without limitation. Patents were a qualified right, subject to governmental interference in the interest of the nation.

Bismarck's committee of experts meeting in 1876 was fully dominated by this older view.[45] One of its members was founder of the Siemens Combine. He was already concerned about the possibility that American Edison and British Thomson-Houston would take out many patents in Germany—before the German firms could develop their own research. He said bluntly:

> You might consider a rule that patentees are bound to grant licenses as an interference with the right of the inventor; but such a rule is absolutely necessary. The interests of [German] industries require that licenses be made available as a matter of right. Today industry is developing rapidly; and as a result monopolization of inventions and abuse of patent rights will inevitably expose large segments of industry to serious injury. The government must protect industry against these dangers. From abroad another danger may arise. Inventive work is far more developed in England, United States and France than in Germany. Up to the present the number of patents taken out in Germany by foreigners has been small because the scope of protection given to the inventor has been insufficient. New legislation will lead to a substantial increase of foreign patentees. We shall experience a wave of foreign—particularly American—patent applications. These patents will not be taken out in order to protect industrial plants established or to be established in Germany; they will be taken out to monopolize production abroad. These articles will be imported into this country.
>
> Such a danger must be met. It is not enough to provide that foreign patentees be required to submit "evidence" that they have established a plant in Germany. Such

[44] The Statute of Monopolies in 1623 provided that letters patent could be granted for the "sole working or making of any manner of new manufactures within this realm"; and subsequent court decisions construed this provision to include protection to imported technologies as well as genuinely new inventions.

[45] "Protokolle" of the Committee of Experts on Patent Law (Patent Enquete), Drucksache No. 70 des Bundesrats Session von 1876. II DRUCKSACHEN IN DEN VERHANDLUNGEN DES BUNDESRATS DES DEUTSCHEN REICHS, Session No. 70, 9 (1876).

evidence may be mere "shadow"; they can merely keep a small domestic production going to maintain their patents. The French have an effective weapon—a rule that patents shall be forfeited if an inventor imports or permits others to import patented goods. However, the French method is inconvenient to trade interests, and would meet serious objection here. The requirement of actual manufacture under the patent would be excellent if the patentee were forced to show production in such quantities that domestic needs are actually met.

The same end can best be achieved by requiring that licenses be granted. The administration of this plan may be difficult. But the administrative agencies and the courts should be able to meet the difficulties and to come to a modus vivendi. Royalties should be based on the importance of the inventions. In the U. S. today there is what amounts to a compulsory license feature since the courts usually dismiss suits of patentees for infringement if the defendant can show that he has offered reasonable royalty but was refused a license.[46]

Siemens ended with the proposal that licenses of right should be made available at the end of the fifth year of patent protection. He felt that any other arrangement would be inconsistent with the public interest.

This same meeting was attended by one of the founders of the Hoechst Farbwerke, predecessor of I. G. Farben. Bruening took the position that the entire chemical industry should lie outside of patent protection. He said:

In the chemical industry the most harmful effects of patents are made clearly evident. Patents in France and England prevented the development of new chemical branches such as the manufacturing of aniline and alizarin dyes. Invention in chemical technology consists largely in an idea, and the practical exploitation of this idea usually involves enormous difficulties. In England and France patents for the manufacturing of aniline and alizarin dyes have been issued to the inventors who have not succeeded in the effective exploitation of their invention. In those countries monopolistic organizations came into existence which could not themselves produce and their major function was to prevent the development of other plants. In Germany, however, the chemical industry was able to expand because no patent protection prevented the free play of competition.[47]

In the meantime the American view of patents as private property came into popularity in other countries. Between 1873, the year of the Vienna conference, and 1878, the year of the Paris convention, the American view prevailed in all

[46] Siemens' last sentence seems in direct conflict with established American law and judicial practice.

[47] Bruening was not alone in his application of the public instrument rule for the chemical industry. While he did not prevail in Germany against Duisberg, the chief promoter of the patent movement in Germany's chemical industry, the Swiss Chemical Industrie succeeded for some time in making this view the official Swiss position. At the last moment, before the international convention went down the line in favor of the unlimited patentability of chemical inventions at the Paris convention in 1878, the Swiss representative pointed out:

"The grant of chemical patents means the establishment of a privilege which is actually a monopoly for a temporary period. In France a patent was granted to the firm of Renard Freres covering the field of aniline. The French industrialists who later succeeded in manufacturing this product commercially had no choice but to become refugees in Switzerland in order to produce. France rendered a great service to Switzerland in making this gift." JOURNAL OFFICIEL DE LA REPUBLIQUE FRANCAISE 9152 (1878).

It is interesting to note that Renard Freres remained obscure, while the Basel dyestuffs producers developed into a world power in the chemical field.

[48] Meeting of Sept. 6, 1878, JOURNAL OFFICIEL DE LA REPUBLIQUE FRANCAISE 9151 (1878).

European countries except Germany, Switzerland, and Holland.[48] In consequence, the following formula was submitted at the Paris meeting:

> The right of inventors and industrial creators in their own work or the right of the industrialists in their trademarks is a property right which has its basis in natural law. The law enacted by each nation does not create these rights but only regulates them.

The Swiss delegation joined issue by offering a counter motion:

> The rights of the inventor and creative worker are a creation of equitable and useful principles of the law of each nation which should reconcile this right of the inventor, based on the grant of a temporary monopoly, with the rights of society.[49]

The Swiss motion was voted down and the "property" motion won, though the clause "which has its basis in natural law" was eliminated.

Once an international convention declared inventions and patents a type of private property, it was only logical to grant to the "owners" of such property equal protection under the law, whatever their nationality might be. In the philosophy prevailing at the end of the nineteenth century, no principle was more sacred than the mutual protection of the vested interests of private property. Once patents were recognized as a type of private property there was no possible justification for the continuance of the forfeiture penalty for importation of patented goods or for the harsh rules respecting working clauses. The French system broke down almost immediately, and the working clauses gradually fell into disuse. The priority rule made its obsequious entry as a simple convenience for the property owner.

Germany continued to remain outside of the convention during the Eighties and mid-Nineties.[50] In that country the scope of the patent grant was limited in the interest of encouraging further invention, and patents were subjected to compulsory licensing. But in 1897, at the Brussels convention, Germany appeared and prepared the way for her retreat.[51] One of her major concerns was the elimination of the working clause.[52] To this end she won the ardent support of the United States.[53]

[49] *Ibid.*

[50] FESTGABE DES DEUTSCHEN VEREINS FÜR DEN SCHULTZ DES GEWERBLICHEN EIGENTUMS: DER ANSCHLUSS DES DEUTSCHEN REICHS AN DIE INTERNATIONAL UNION 901 (1902).

[51] Report of the U. S. Delegates to the Brussels Conference of 1897, in REPORT OF THE COMMISSIONERS APPOINTED TO REVISE THE STATUTES RELATING TO PATENTS, TRADE AND OTHER MARKS, AND TRADE AND COMMERCIAL NAMES UNDER ACT OF CONGRESS APPROVED JUNE 4, 1898 192 (1902).

[52] The statement of the German delegates contained the following: "The Imperial Government considers that, in requiring the working of the patent under pain of forfeiture, obligations at the same time onerous and in part impossible to realize are imposed on the inventor who has demanded and obtained a patent in a certain number of States, and that without real profit to industry in general. To restrain the obligation of working is, then, in its eyes one of the ends to which the efforts for an international understanding should principally be directed. It is from this point of view that it appears to be desirable to establish an article by virtue of which the actual working in one of the contracting States shall remove in all the other contracting States any prejudice resulting from lack of working." *Id.* at 210.

[53] The Americans took the position that "abolition of working altogether would be an act of reciprocity toward the United States, which now grants unrestricted patents to citizens of countries which impose such a condition." *Id.* at 201. Opposition to the working clause has always been maintained

In 1901 Germany joined the Union.[54] In a short time she became, along with the United States, the most ardent defender of the Union. In the later conferences the two countries worked together effectively to strengthen the protections accorded the patentee.[55] In fact, the International Patent Convention can now almost be referred to as an American-German patent alliance.[56]

IV

How could this situation come about? How was it possible that an international agreement on patents could be arrived at between industrialized countries and those on the make?

The answer lies primarily in three factors: (1) the transition from free trade to high tariff, accomplished by Germany in 1879 and by other European countries shortly thereafter; (2) the domestic patent agreements in the German chemical industry which had wide effects throughout the world; and (3) the development of the American-German patent cartels.

Quite rightly the Austrian-American invitation to the Vienna conference referred to the Seventies as a "time of liberal customs policy."[57] But when Germany joined the Union the change from free trade to tariff protection had already taken place. As a result, the rule of the Union prohibiting forfeiture of patents if goods were imported no longer had any significance. A high tariff could—and did—have the same effect as forfeiture in the case of non-use; indirectly imports were prohibited, and without domestic production no exploitation of the patent remained possible in that country.

The whole doctrine of the "equality of foreigners with citizens" in regard to patents also came to have a very different significance when a nation was behind a tariff barricade. To be sure, the formal legal position of national and foreigner remained "equal." But the national having one plant inside the tariff wall could

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in the United States, and is to be found in a statement of Conway P. Coe, former U. S. Commissioner of Patents, at a House hearing in 1935. He said: ". . . there are European countries that have a working requirement in their patent law. However, I do not think that those countries have progressed industrially as we have here. I see no reason for imposing a law of a foreign country that is backward in patent development and industrial development on a country whose industries have prospered as they have in this country. There are many people who say that the industrial supremacy, that the United States now enjoys, is attributable in no small measure to our own patent system." *Hearings before the Committee on Patents on H. R. 4523*, Pt. I, 74th Cong., 1st Sess. 1068 (1935).

[54] FESTGABE DES DEUTSCHEN VEREINS FÜR DEN SCHULTZ DES GEWERBLICHEN EIGENTUMS, DER ANSCHLUSS DES DEUTSCHEN REICHS AN DIE INTERNATIONAL UNION FÜR GEWERBLICHEN RECHTSSCHUTZ 43 (1902).

[55] Commissioner Coe stated categorically in 1935 that "while the international convention for the protection of industrial property was revised in a number of points, those revisions invariably approached the American law; and every other country in the world belonging to this convention, or practically every other one, yielded its own domestic law in favor of what is apparently regarded as the superior patent laws of the United States." *Hearings before the Committee on Patents on H. R. 4523*, Pt. I, 74th Cong., 1st Sess. 1067, 1068 (1935).

[56] By 1935 the German patent structure had become such a bulwark in the protection of the rights of patentees that such an eminent expert in this field as Lawrence Langner could seriously suggest that the German patent system had started in 1780 or 1790. *Id.* at 630.

[57] Document entitled *Universal Exhibition 1873 in Vienna, International Congress for the Consideration of Patent Protection.* (National Archives, Washington, D. C.)

exploit his patents there and also—through exports—in those countries without tariff protection. On the other hand, a producer in a non-tariff country had to confine his activities to free-trade countries, unless he was willing to establish a plant in the country with tariff walls. As a matter of fact, without a tariff Germany could not have adopted the conditions of the patent convention unless she first relinquished her industrial ambitions. Exactly the same was true of other industrially backward countries. If they aimed to achieve an industrial position of their own, they had to combine membership in the Union with a protective tariff. The patent convention alone would have resulted in a monopolistic position for those countries which were most industrialized at the time the convention was signed.

The patent convention, combined with tariff protection for the partially industrialized countries, opened the way to two possible developments:

1. The exercise of monopoly rights for the patentee through establishment of manufacturing plants in protected countries and through exports to unprotected areas;

2. The development of cartel arrangements among producers in industrialized competing countries, themselves frequently protected by high tariffs. This was accomplished through the exchange of patent rights among these producers, under which home territory was insulated from possible competition by private agreement and backward countries were parceled out as mere marketing outlets.

It is to be noted that both of these devices have the same purpose—the limitation of competition through the exclusion of newcomers. The first guarantees price protection and the established power of a dominant unit in the industry; the second serves the same function for a multiplicity of units, each with considerable economic power and constituting a grave potential threat to the others.

The statement has been made that the enactment of a tariff statute was a precondition of Germany's participation in the international patent convention. Can we say the same in respect to cartelization and patent agreements?

At the outset the timing of the two events—Germany's entrance into the convention and the development of the patent cartel—is remarkably coincidental. This can best be indicated by reference to the German dyestuffs industry, which, between the 1890's and World War I, was the outstanding example of international monopoly based on patent rights.[58] More accurately, it was monopoly over the international market exercised by a domestic cartel. It will be recalled that, during the Bismarck investigation, Bruening had given a pessimistic prediction of the consequences of an uncontrolled patent policy in the semi-industrialized German economy. But his confrere, Carl Duisberg, saw the situation in a wholly different light. He proposed to the competing dyestuffs enterprises in Germany that they form what in effect amounted to a domestic patent pool.[59] In this manner the hundreds

[58] *Hearings before the Committee on Patents*, Pt. 5, 77th Cong., 2d Sess. (1942).

[59] Testimony of Heinrich Kronstein in *Hearings before the Committee on Patents*, Pt. 3, 77th Cong., 2d Sess. 1270 *et seq.* (1942).

of patents taken out by the major German firms would be pooled; new advances in the rapidly developing technology would be available to all the established units; and additional chemical research would be speeded. At the same time such a plan was calculated to freeze the existing units in their predominant position, and upstarts in the industry would effectively be excluded. This plan was adopted. As it worked out, Bruening's genuine fear that patents would be a handicap to the established units did not materialize; the effect was, on the contrary, to cement their position at the expense of newcomers. The near completion of this ambitious program coincided with Germany's entrance into the international patent convention. Its success was so great that within a short time the entire world dyestuffs market fell under the control of the German domestic cartel.

In the United States there was hardly a flutter of protest as the cartel took over the American field. In fact, this Government was so persuaded that patents were private property, to be accorded the fullest protection, that unusual steps were taken: in 1909 the United States entered a special treaty with Germany assuring her that German patentees would not be required to manufacture in this country.[60] The British at least moved from the class of mere markets of the monopolist into the class of countries where the monopolist had to manufacture. In 1907 they made a dramatic return to the pre-convention requirement of the working clause.[61]

In at least one specific instance Germany did use the International Patent Convention to cement its monopolistic position. This was in connection with Switzerland. At the turn of the century Switzerland loomed as a real competitive threat to Germany's dyestuffs industry; and it persistently refused to grant patents for the protection of chemical processes. In this case the United States came to the aid of Germany. At the 1897 patent convention in Brussels, the United States—with no dyestuffs industry of its own—proposed that Switzerland should be punished for its dereliction in the chemicals field by discriminatory measures against it.[62] Was this an expression of the American-German patent alliance? In 1904 Germany sent a virtual ultimatum to Switzerland, demanding that it grant patents on chemical processes under the patent convention's requirement of equality of treatment to nationals and foreigners. To force compliance, it threatened Switzerland with an import tariff on Swiss goods based on the total volume of its exports into Germany.[63]

The Swiss parliamentary debates of 1904 and 1907 give a dramatic account of the conflict.[64] From one side comes the charge that Switzerland is opposed to the grant of chemical patents because she wishes to enrich her own industries by

[60] *Id.* at 1294.

[61] Patents and Designs Act of 1907, 7 Edw. VII, c. 29, §27(2).

[62] Reported by Mury in the Swiss Parliament (Nationalrat) on Dec. 22, 1904, XIV AMTLICHES STENOGRAPHISCHES BULLETIN 615 (1904).

[63] Report of Mr. Hoffmann in the Swiss Senate (Standeret) on Dec. 17, 1906, XVI AMTLICHES STENOGRAPHISCHES BULLETIN 1435, 1468 (1906).

[64] *Ibid.*

securing technological developments from abroad for nothing. The defense of those opposed to the grant of such patents is that they inevitably lead to monopoly; and the German dyestuffs industry is cited as the prime example. The very fact that the German government and the German chemical industry were demanding that Switzerland grant chemical patents was taken as an indication that the real purpose was to compel Swiss industry to join the German dyestuffs cartel. History proved that this charge was correct, for in the end the Swiss industry was compelled to become a junior partner in the German dyestuffs group.

The second development—the international patents pool—also was made possible by the international patent convention. In 1876 Siemens envisaged a situation in which the industrially weaker countries would suffer under a wave of foreign patents. This was a German problem. But between 1875 and 1900 German technology, particularly in some branches of the electrical industry, developed rapidly —more rapidly than in this country. This constituted an American problem.

A tentative solution was reached even before Germany entered the patent convention. This related solely to electrical production in Germany. The German electrical firms were protected by a domestic tariff; the American companies were deeply entrenched in world trade and operated plants in Germany. In 1902 Union Elektrizitatswerke A. G., subsidiary of the American interests, and the Allgemeine Elektrizitatsgesellschaft A. G., close to the Edison Group in the bulb field since 1885, entered into a patent exchange agreement covering the German market.[65] In this manner the established units guaranteed each other's positions in the German market and constructed a wall of basic patents and improvement patents to shut out the newcomer.

In 1903—two years after Germany's entrance into the convention—a patents agreement covering a wider sphere was well under way. The purpose was to eliminate competition in the home markets of the German and American producers and to effect a world division of territory between them. In December, 1903, Emil Rathenau reported at a shareholders' meeting of AEG that an over-all agreement with General Electric—newly organized in the United States—had finally been consummated.[66] In February, 1904, he reported that GE's exclusive territory was the United States and Canada; AEG was given exclusive rights in Central and Eastern Europe, Russia, and the Middle East. Special marketing arrangements for the French and British markets were made with the GE affiliates.[67]

The rapidity with which the patent exchange agreement technique was seized upon by other industries is an indication of its usefulness. The period between the first and second World Wars was characterized by incessant activity in the building up of international patent agreements in a wide variety of industrial fields. Virtually every manufacturing industry, where concentration of control existed domestically,

[65] 1 Kartellrundschau 55 (1903).
[66] 1 Kartellrundschau 1242 (1903).
[67] 2 Kartellrundschau 308 (1904).

sent its business diplomats abroad to negotiate such agreements.[68] In the United States this type of agreement had particular appeal because of the existence of the antitrust laws. As the president of Osram, the German electrical company, stated in 1932, perhaps more frankly than would his American partners:

> It is of special significance that our old collaboration agreements relating to the exchange of inventions and experience which were made between the American and the other enterprises, were a good basis even as far as American law is concerned, since the reservation of certain countries for exclusive supply was based on a lawful basis. The world agreement could therefore be certain not to be attacked from the American side. The old agreements were on a sufficient basis to accomplish the aim of the distribution of the markets.[69]

In the United States a bald attempt to enter into agreements to restrict production, make exclusive allocations of world territory among dominant producers, and establish a structure of fixed prices, would have cut directly athwart the antitrust laws. The patent exchange agreement could be made to accomplish the same things, and it offered certain distinct advantages. The doctrine of patents as private property in the absolute sense was well established; and—if one did not go back too far—was sanctified by a number of favorable court decisions. Even in the event of an antitrust suit, much could be said in its favor. The complicated structure of patent rights and privileges in an industry created innumerable problems in the prosecution of such cases by the Government—both in the gathering and presentation of evidence and in the remedies proposed. In several instances the sheer magnitude of the economic problem proved to be too much for the courts; and they retreated into technicalities of the patent law to escape the task of a drastic reorganization of the industry.[70]

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Thus the international patent convention was tightly coordinated with national tariff policies in the pre-war structure of restrictive practices in international trade. In a very real sense, it set the stage in the 1880's for what came later; it made possible the restrictive patent exchange agreements with their widespread economic effects felt throughout the world. Once the convention had turned all countries in the direction of accepting patent protection and establishing international standardization of practice, it was a logical next step to press for increasing protection of the rights of the patentee. In effect, the various governments, by international agreement, abdicated control over patents in the national interest to private patentees; and the latter were quick to institute a private system of control through international patent agreements.

[68] *Ibid.*

[69] Testimony of Heinrich Kronstein in *Hearings before the Committee on Patents*, Pt. 3, 77th Cong., 2d Sess. 1318 (1942).

[70] Marcus, *Patents, Antitrust Law and Antitrust Judgments Through Hartford-Empire*, 34 GEO. L. J. 1 (1945).

A realistic study of the patent convention, looking toward revision, is now long overdue. The draft of the charter for the International Trade Organization contains such a proposal; but if this agency is too long in the making, some other instrument for the investigation should be devised. A recent Argentine decree[71] permitting the government to open such patents as are "responsible for unjustified price booms," indicates that the problem remains on the agenda—whether the Foreign Trade Council likes it or not. The investigation proposed should look toward the creation of international patent practices which further the exchange of information in the interest of technological expansion everywhere. Until this is done, the patent convention will remain captive to policies of trade restriction under private control.

[71] Neue Züricher Zeitung, June 15, 1947.

NATIONALIZATION AND INTERNATIONAL PATENT RELATIONS

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I

The object of this essay is to examine the relation between socialist institutions and the patent system. More specifically, we mean to investigate: (a) the position of a citizen-patentee amid socialist institutions; (b) the position of a foreign patentee in petitioning for and holding patents in a nationalized economy; and (c) the significance of a foreign sovereign's acquiring or holding patents in the jurisdiction of another government. Two of these inquiries raise issues of public policy. The United States Government cannot remain unmoved at the prospect of its nationals' property rights in technology being radically affected by the nationalization of industries abroad which are or might be users of such property. Nor can our Government fail to assess the effects upon our domestic trade and commerce of the holding of large blocks of United States patents by foreign governments. A part of the essay which follows will attempt to set forth the steps which our Government has taken to met these problematic situations.

The study ventures upon unfamiliar grounds. Our information concerning the significance of the patent in socialized states is abundant in a country like the Soviet Union, where socialism is not only complete but of sufficient duration to provide generalizations. The case of countries which have recently come to socialism, and then only on a limited scale, is quite different. Here our knowledge is meager, our generalizations hardly more than conjectures, and the challenges engendered by the new institutions have scarcely been discerned, let alone met. There will, therefore, be ample room for correction of fact and emphasis in later studies.

II

Pigou could write with confidence in the third decade of this century that socialism was to be likened to an island in the lake of capitalism. Recent history has not marred the literary elegance of his sentence, for if we invert its meaning it can still express a truth. Most of the world's goods are, to be sure, produced under capitalist institutions, but the majority of European peoples are now living under governments which in varying degrees of intensity can be considered socialist. At the outbreak of World War II the USSR was the only conspicuous socialist economy; but in the short space of a half decade eight countries have in some measure

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adopted socialist institutions. Five countries, Bulgaria, Poland, Hungary, Rumania, and Yugoslavia, are relatively unindustrialized countries where the substance of the new socialism has its greatest significance in land reforms. In two countries the course of socialism has been modest, but because France and England are highly industrialized areas the effects will doubtless be of great consequence. Socialism in Czechoslovakia is not only an industrial phenomenon but far more pervasive than the "socialisms" of western Europe.

The use of the term "socialism" can present considerable difficulties in definition. However, since we are concerned with the more obvious consequences of socialism, we can be content to define it as a form of organization in which a bureaucracy maintained by communal levy undertakes to issue the principal commands with respect to industrial and business policy. In its more familiar form socialism usually includes the passage of title to some or all of the industrial capacity of a country to the government, but where the bureaucratic command is pervasive and detailed "the ownership of the means of production" by the state is little more than an accounting device.

The advent of socialism in western and eastern Europe has left no significant accretions in the patent laws of these countries. The evidence at hand suggests that the juridical and administrative procedures for acquiring and defending patents have not been materially altered. Thus, we are obliged to look beyond the ordinances and rules through which a government grants a patent monopoly to the new institutions cast up by socialism, and inquire how the old patent works in the new milieu.

III

In a capitalist economy a patent has a legacy of meaning on which most of us can agree. The patent gives a patentee or his designated agent an exclusive right to practice an invention for a prescribed period. In many jurisdictions, where conventional property institutions exist, he is free to refrain from practicing his invention. And once in possession of a monopoly grant the patentee, notwithstanding the metaphysical disputations to the contrary, can treat his grant as "property" and proceed to bargain as he would if he controlled less unusual property. There is no need to enter here upon the many uses which such property is made to serve in a capitalist economy, for the ways of the patent are as manifold as the stratagems of persons and the practices of business enterprise.[1] But what is important to realize is that the decision belongs to the owner of the patent, and that the state or government does not interfere except in cases where the law has been infringed.[2] The

[1] An extensive record of the ways of the patent appears in *Proceedings of the Temporary National Economic Committee* (1939-1940); *Hearings before the Committee on Patents on S. 2303, A Bill to Provide for the Use of Patents in the Interest of National Defense or the Prosecution of the War, and for Other Purposes*, 77th Cong., 2d Sess. (1942); and WALTON H. HAMILTON, PATENTS AND FREE ENTERPRISE (TNEC Monograph 31, 1941).

[2] Infringement of the law in some countries includes failure to use the patent, and might involve as a remedy the licensing of the patent by government command.

patentee may never have access to them, but there are a free labor force, private capital, producers of capital equipment ready to serve private interests, and a body of consumers whose purchases are by and large not rationed. A patentee is not *ipso facto* foreclosed from exercising discretion over use, sale, and production with respect to his invention. His freedom is not absolute, but neither is freedom an ill-advised word to describe his estate.

Now whenever initiative for business and industrial policy shifts to a bureaucracy maintained by a communal levy, and whenever title to a substantial portion of a community's industrial plant passes to government, we have socialism. But it is not the static nature of an economy which arrests our attention; it is rather the government's policy as to *how* and *when* new enterprise may be started, and by *whom*. Socialism usually also implies that government has made known in advance that certain fields of activity are *open* or *closed* for private endeavor. Such declarations may be candidly made in laws, regulations ordinances; sometimes, however, policy must be inferred from the hurdles which government puts in the way of the activities of its citizens or residents.[3]

Where government, through bureaucratic control or ownership, or both, makes the vital decisions as to production, sale, source and availability of credit, and labor force, the position of the patentee is accordingly altered. For technology is the neglected fourth in the tetrad of factors of production, and as they go so we should expect technology to go.[4] If technology does *not* come under direct government command or dominion along with the other elements of production, there are good reasons for it, as we shall presently see.

The limitation on the right of the patentee to put his invention to work in an enterprise of his own risk is one consequence of a "planned" or socialized economy. If an inventor's contribution falls in a field which government owns or manages he is confined to dealing with the government, and if, as is usual, there are no competitors with the government, his bargaining position is lost. Because he is blocked from entrepreneurial paths the patentee must look to such rewards as the government may give him for the use of his inventions.

The status and prerogatives of the citizen-patentee in a country like the USSR with a long history of socialism are well known. Research and professional invention is a select career and its practitioners enjoy above the average income, housing, food and clothing rations, and educational advantages for their children. The basic reward for contributions to the advancement of the industrial arts is a professional emolument, and the patent or author's certificate is, as it were, a bonus. The provisions of the Soviet patent system are set out in the revised law of 1941,[5] and convey

[3] The hurdles may take many forms: permits for raw materials, permits to produce, quantitative restrictions on production or sale, control or refusal of credits, control of labor force, currency control, taxation schedules, etc.

[4] Veblen perhaps unjustly berated his fellow economists for neglecting the "state of the industrial arts" as a factor in production. THORSTEIN VEBLEN, THE ENGINEERS AND THE PRICE SYSTEM 27-28 (1921).

[5] Sobraine Postanovlenii i Rasporiazhenii Pravitelstva Soyuza Sovetskikh Sotsialisticheskikh Respublik, March 25, 1941, No. 9, Art. 150. The Legal Division of the Library of Congress has translated the entire law.

to the first and true inventor a fifteen-year monopoly on his invention. The patentee is free to license any individual or corporation in the USSR, and has the customary relief against the unauthorized use of his invention. The law provides that in the event the patentee and a prospective licensee fail to reach an agreement as to the conditions of use of a patent, the state may declare a compulsory license. No special awards or rewards are given the patentee beyond the terms he reaches in an "open" bargain with his licensee. Any foreigner may secure a patent in the USSR on the same conditions as a Soviet national.

The author's certificate, which is a distinct departure from the conventional patent, has a wide currency in the USSR. The certificate testifies to the novelty of the invention and names the person responsible for the contribution. All rights and title to the invention pass upon issuance of the certificate to the state, and the inventor receives a compensation adjusted to the contribution of the invention to efficiency, improved quality, and sales of a new product.[6] In addition to monetary rewards, certain social benefits run to the inventor. Unlike the patent, the author's certificate does not require the payment of annual fees for its maintenance. The Soviet policy of favoring the author's certificate over patents has borne fruit; Soviet statistics as of 1935 show that under the 1931 law 99 per cent of all domestically developed patentable inventions were covered by author's certificates.[7]

Under Soviet practice the patent is a vestigial institution; it is suffered principally in order to give the appearance of a regime of equality for inventions of foreign origin.

The systems of privileges and rewards for inventors and research workers employed in nationalized industries in countries newly come to socialism have their origins in the past. It is clear that the advances in technology in nationalized industry will be made by government personnel, and governments have merely extended their traditional policy toward the inventions of their employees to research workers employed in nationalized industries. The rules generally provide that if the employee is hired to do research, all rights pass to the government; and where invention results during the working hours of the employee or is assisted by knowledge and facilities provided by government, certain equities in the invention are to pass to the government. As a rule (which present circumstances tend to render inflexible) the employee is obliged to pass foreign rights to the government.[8] As government begins to assume the entire burden for the progress of the industrial arts in nationalized fields, rather than the role of partnership with private enterprise which was customary in western Europe in pre-World War II days, it is likely that

[6] Decree of the Soviet of People's Commissars of the USSR, No. 1904, Nov. 27, 1942, *Concerning the Confirmation of the Directive Regarding Remuneration for Inventions, Technical Improvements, and Suggestions for Rationalization*, sets forth a detailed schedule for rewards for inventions covered by author's certificates. Available in translation at the Library of Congress.

[7] 17 J. PAT. OFF. SOC'Y 572 (1935).

[8] See REPORT AND RECOMMENDATIONS OF THE ATTORNEY GENERAL TO THE PRESIDENT, INVESTIGATION OF GOVERNMENT PATENT PRACTICES AND POLICIES, Vol. III (Gt. Britain) 85-109, (France) 109-111 (1947). Substantially the same practice exists in Czechoslovakia, Poland, Hungary and Rumania.

a more formalized arrangement will have to be achieved. For government now enjoys a monopoly in the nationalized fields, and for the employee to retain even limited rights to inventions in the hope of attracting additional rewards is no longer possible. His only customer is his employer.

The change in the status of the patentee has been accompanied by the assertion of a direct interest by the government in patents. Nationalization has led to the passage of title to patents from private enterprises to government, and in a manner of speaking government has recovered its own monopolies. Some violence has been done to the traditional conception of the patent when government undertakes to grant to itself patent monopolies. For it is universally recognized that the patent is given *by governments* for an advance in the useful arts, and where the government is the patron and source of the advance it is in the curious position of rewarding itself. True, the actual agent of invention is the government employee, but the conveyance of a patent to him, only to take it away as a condition of employment, is a cumbersome way of recording and recognizing technical achievement. If reason rather than custom informs this action, the government's practice must be directed to outsiders and not its own nationals. A patent duly protecting an invention may enable a government to proceeed with production, use, and sale of the invention without embarrassment from rival claims made by foreign nationals in its own patent office. Likewise, control of patents gives a government a measure of control over foreign investment and imports through a device which in appearance is far less arbitrary than quantitative restrictions on imports, tariffs, embargoes, currency controls, and similar devices. Doubtless the maintenance of a domestic patent system also provides a medium through which technology of foreign origin may come to the country and find general disclosure. And finally, despite the de facto inequalities in socialist and capitalist economies as to the right to exploit patents, the maintenance of a patent system and patent office at least suggests a *formal* equality between the two regimes.

IV

One of the larger consequences of nationalization for international patent relationships is the passage of patent rights in foreign jurisdictions from their nationals to the nationalizing governments. There can be little doubt that the scope of recent nationalization decrees in Britain, Czechoslovakia, Hungary, Rumania, Yugoslavia, France, and Poland, among others, has vested in the governments full title to and administrative powers over foreign patents controlled by their nationals.[9] It requires little reflection to measure the consequences. One government hereafter will exercise in the jurisdiction of another government *some* powers over the domestic trade and manufacture of the latter. The extent of such powers, moreover, will be more than nominal, for most nationalizing governments have inherited *entire industries* together with the whole repertoire of technology peculiar to those industries. And

[9] The areas nationalized differ in the countries enumerated, but this does not alter the pattern of control over those sectors of the economy that have been nationalized.

because the repertoire of technology, at least as to its strategic elements, has doubtless been subject to patents in foreign jurisdictions, the nationalizing government is in a position to interfere substantially in the economic life of other countries. As we shall see, this situation is likely to be aggravated when future technology originating with governments with nationalized industries *or* governments supporting large-scale research endeavors with public funds seek and acquire patents in foreign jurisdictions.

The ownership of patents by one sovereign in the territory of another sovereign is strictly a contemporary phenomenon.[10] But there are signs at hand to indicate the uses to which the patents are to be put. One government in dire need of dollar exchange is pursuing the policy of licensing its patents to American manufacturers, usually on an exclusive basis. Such practice is tempered by export policy; licenses will not be forthcoming when in the opinion of the government it can more remuneratively service the United States market with its own manufactures. Of the countries newly come to socialism in some degree, France, Great Britain, and Czechoslovakia have a vital interest in the United States market, and it may be expected that self-interest will dictate that their position be used to secure a place in this market. It is unlikely that these governments will take up their right to manufacture in the United States; but advantage and power may cause them to withhold their technology from domestic manufacturers.[11]

The patent position of foreign governments will not be completely accounted for by the research activities of their nationalized industries. It has long been recognized that research of a basic and applied nature is a proper function of government, and the postwar budgets of the major countries reflect the fact that government will play an increasingly active role in subsidizing and sponsoring industrial research. A considerable literature exists on the organization and direction of government research in foreign countries; here it suffices to record that Great Britain is spending 19.5 million pounds annually on civilian research,[12] France 917.8 million francs.[13] But the chief point to be made for our purposes is that the research is preponderantly in the field of applied science, capable of yielding patentable inventions, and that the problems pursued reflect the government's interest in improving its competitive position in foreign markets. Patents, both domestic and foreign, will therefore emerge from these "public interest" activities in greater numbers than from the research associated with nationalized industries.

The exercise of wide powers by one sovereign over commerce and industry in the

[10] The older socialism of the USSR has paid little attention to foreign patents. In the United States some twenty patents were issued to nationals of the USSR in the period 1940-46. See 29 J. PAT. OFF. SOC'Y 102 (1947). There is no current knowledge at hand to show how these patents have been administered, but they fall in widely diverse fields and have not exercised any appreciable influence on industry in the United States.

[11] It is well known that there are no existing powers at the disposal of this government to compel the licensing of domestic manufacturers.

[12] 159 NATURE 702-3 (1947).

[13] Budget of the Government of France (1947).

territory of another sovereign is something which western mores, sometimes called international law, do not condone. It is not necessary to document the fact that an allegation that such powers have been exercised is subordinate in gravity only to the charge that the territorial sovereignty of a government has been violated. Indeed, the proliferation of international organizations under the old League and now under the United Nations is fundamentally designed to insure *agreed and concerted* action between states toward common problems, so that no government will be obliged to bear the onus of having interfered in the domestic affairs of another country by unilateral action.[14]

There is a temptation to resolve the public policy issues of a government's exercising direct influence over the economy of another state by recourse to a kind of formal reasoning based on the principles of "national treatment" or "reciprocal treatment."[15] Thus, in the first case it could be said that this government should not take any special action against the patents or applications for patents of foreign governments, on the ground that our government also takes out patents, and that equality dictates similar treatment. The principle of reciprocity might be used to argue that since no foreign government *formally* discriminates against United States Government-owned patents, the United States should offer *formal* safeguards for inventions originating with foreign governments. Doubtless, both principles circumscribe what constitutes equity in dealing among nations, and for this reason we have no quarrel with them. But we do maintain that into the formalisms there needs to be interjected a liveliness born of facing the de facto situation squarely; the principles are guideposts to a solution, they are not resolutions of the problem.

The bare fact of a sovereign's holding United States patents is of little consequence. The situation becomes problematic only when the patents are *used* in a manner to further the economic welfare of one country at the expense of another. And this means among other things deciding that the country granting the patent is to be an importing territory, and that the patentee-government will block production in the country conveying the patent by refusing to license nationals of that country. We have seen that this is more than a contingency to be entertained in theory.

Now to be sure, a patent policy such as that just outlined can be pursued with impunity by a citizen patentee of a foreign country. But a citizen, and here I *do not* mean a patentee who comes to our patent office in his own name as a servitor of his government, cannot be accused of *political* motives, whereas these are precisely the antecedents of government acts. And no remonstrances will serve to dispel this impression. The principle of "national treatment," therefore, proclaims an inequality when it says that a politically minded sovereign petitioning for a patent should be

[14] The International Bank and the proposed International Trade Organization are examples.

[15] National treatment: treatment on a par with that extended to nationals of a state. Reciprocal treatment: treatment afforded to an alien on the basis of the treatment extended by the state of which the alien is a national to nationals of the receiving state.

on the same footing as a national of the home country. And even when the principle counsels the equal rights of a home government and a foreign government in a patent office it fails to enforce strict equity because it has been the traditional policy of the United States Government to license all applicants under United States Government-owned patents on a royalty-free basis. This, needless to say, is a policy not pursued by any foreign sovereign under its United States patents.

The invocation of the principle of reciprocal treatment is also beset with difficulties. For while foreign sovereigns may use their United States patents to make the United States market a preserve for certain kinds of manufactures, the United States Government, standing on an equal footing with other patentees of foreign countries, is for the same acts that foreign countries commit in the United States liable to "licenses of right" and other varieties of compulsory licensing. Moreover, if the United States Government's patents fall in the fields of nationalized industry, its bargaining position, compared with that of foreign sovereigns who have a multitude of competing firms to approach in the United States, is severely limited.

From the foregoing it becomes clear that a solution is not available if attention is limited to considerations of *formal* equalities. Where institutions and policy in different countries vary widely, formal equivalences are fraught with travesty. Faced with this dilemma, some might advocate the abolition of the problem by recommending the revocation of existing government-owned patents, putting a stop to the issuance of patents to governments, or possibly enacting compulsory licensing legislation to run against governments.

Such proposals are extreme. Proponents of such views have probably not reflected on the fact that in many countries the combination of nationalization and government support of research will result in all technology's having its origin with the government. Under these proposals the technology of such a country could not be protected in the United States. On the other hand, American technology, which originates both with government and with private agents, can at this time find protection in foreign patent offices. Such a regime of inequality could not be long condoned by the affected foreign governments. The retaliation which foreign governments would direct against the United States would in all probability embrace both government and private technology; for the foreign government would look to the substance rather than the form of the American discrimination. If the United States refused to protect the patentable technology of another government, where that technology was wholly accounted for by the government's activities, that government would feel justified in excluding the entire repertoire of American technology from the privileges afforded by its law.

V

An Executive Order recently released represents the attempt of this Government to arrive at an equitable solution of the problem of a foreign sovereign's exercising monopolistic rights in the form of patents in the territory of another sovereign.[16]

[16] EXEC. ORDER No. 9865, June 14, 1947, providing for the protection abroad of inventions resulting from research financed by the Government.

The order requires agencies of this Government to "acquire the right to file foreign patent applications on inventions resulting from research conducted or financed by the Government." The order clearly envisages that the United States Government will grant licenses on a non-exclusive, royalty-free basis to United States nationals and that such patents shall serve to assure a non-exclusive right to American nationals to exploit foreign markets. Paragraph 5 of the order cites further general powers whereby the Department of State, in consultation with the Department of Commerce, is authorized to enter into an exchange of patent rights with foreign governments.

While no information has been publicly released to clarify several of the dark passages of the Executive Order, it is possible to infer the regime envisaged by the order.

First, the order does not impair the rights of foreign governments to acquire patents in the United States. And because the directive requires that United States Government agencies are to pursue a policy of acquiring patents in foreign jurisdictions, it may be assumed that this Government does not intend to take any action at this time which would cause foreign governments on their part to contest this Government's presence in their patent offices.

Second, the preamble to the order, which declares that "it is in the interest of the Government to foster, promote, and develop the foreign commerce of the United States," establishes the fact that this Government regards it to be a fair and equitable policy for governments to attempt to provide access for their nationals to foreign markets through the control of patents.

But third, the offer of this Government to exchange rights to foreign patents with other governments (Section 5) implies that this Government, under appropriate circumstances, is willing to forego exclusive rights under its foreign patents on condition that other governments are willing to do the same with respect to their foreign patents. Notice has already been taken of the fact that among the purposes of the order is the stimulation and promotion of the foreign commerce of the United States, and to this end non-exclusive, royalty-free rights to United States Government foreign patents will pass to American nationals. Thus it would appear that it is the intention of the United States Government to pass only limited rights to foreign governments under a patent interchange agreement, reserving for itself the right to sublicense its own nationals under such patents and thus insuring access by American nationals to foreign markets.

The implication of this Order is clearly that sovereign governments should establish a regime of equality by agreeing with one another as to the conditions of *use* of their patents. Such a course would render unnecessary radical measures such as closing patent offices to governments, or in the case of the United States, instituting a compulsory license system directed against the patents of foreign governments. More important, an accord on the *use* of patents would dispel the impression that a government was using its patents to further its own economic and political welfare

at the expense of the government granting the monopoly. The ugly surmises that a government was restricting manufacture, inhibiting research, or plotting an exclusive sales territory could be dismissed as the extravagant claims of the irresponsible. If governments agreed on licensing provisions with respect to their foreign patents they could clearly reserve for themselves the right to assure the access of their own nationals to foreign markets, which, upon reflection, may be the only legitimate reason for governments' taking patents in foreign jurisdictions.

To be sure, a multilateral or bilateral pooling of governmentally owned or controlled foreign patents involves renunciation; not to be able to convey exclusive rights under patents to their nationals or, alternatively, to others for a monetary or other consideration is to give up rights to which the patentee is formally entitled under the monopoly. But with the renunciation there are rewards. The first benefit is that each signatory government will be assured that the patents granted to foreign sovereigns will not be used to interfere with its domestic economy; an allied advantage is that each government in opening its patent office to the inventions of a signatory government will be assured that its nationals will be free to exploit such inventions. And the entire construction sustains in a practical way the usefulness of the patent institution as a means for the interchange of the industrial arts and protects the system from the corrosive effects of political attack which is sure to come if sovereigns cannot satisfactorily separate their economic and political roles.

VI

The effect of the trend toward socialism that has taken place since the conclusion of the war in Europe upon the position of the foreign patentee has provoked little comment from students or beneficiaries of the patent system.[17] The hesitation may be born of prudence, for no definitive assessment of the effects can as yet be had. None the less, it is significant that in two recent conferences on international patent relationships[18] no intimation of question arose as to the position of the foreign patentee with inventions falling into the operating domain of a nationalized industry. Governments and patent agents have been concerned with mending the fences of the patent system; insuring at the Neuchatel Conference a common policy with respect to the effect of war on acquiring and maintaining patents; and exploring at The Hague certain procedural modifications in the Convention for the Protection of Industrial Property. These valuable international performances tend to reinforce the conviction that international agreement on patents is as yet confined to formal equivalences in treatment.

While governments and patent agents may delay their response to the new situation, business enterprises, which produce crops of inventions as a byproduct of

[17] A good analysis of this problem has been made by Robert P. Terrill, *Cartels and the International Exchange of Technology*, 36 AM. ECON. REV. 745, 761-767 (1946).

[18] Recent meetings have been held by the International Association for the Protection of Industrial Property, May 26-31, 1947, at The Hague; and the Union for the Protection of Industrial Property, Feb. 8, 1947, at Neuchatel.

organized research, must decide without delay where they are to seek protection for their inventions. And the decision as to where they will seek protection involves an evaluation of where and under what conditions they can do business.

Although the sample is not large enough to yield firm generalizations, the writer has inquired of a half dozen of our largest American corporations,[19] which habitually took patents and conducted business in Europe before the war, what changes, if any, the new circumstances have made in their patent policy. They report that they are applying for patents on their inventions in countries like France and England, notwithstanding effective or proposed nationalization in fields of their interest, on the assumption that these governments will bargain in the customary manner for access to technology of foreign origin. The expectation is that those charged with the direction of nationalized industry will carry on patent relationships with the American firms in about the same manner as they were carried on by the former private owners.

American companies actively interested in eastern Europe, excluding the USSR, are continuing to file applications for patents in approximately the same volume that they did prior to the war. The reason for taking patents in such territories appears to be based on their policy of safeguarding exports to these territories and the desire to lay a basis in patents for future technical cooperation with the governments involved. In the case of those companies which are applying for patents in order to assure entrance for their exports, there is a conviction that industrial development in the more complex fields will probably be slow in its realization and that for a considerable period of time these countries, in certain complex and specialized fields at any rate, will be dependent on foreign suppliers.

Those companies which are filing applications for patents in eastern Europe in anticipation of technical aid agreements believe that a firm patent position in a country may lead the foreign government to select them rather than a competitor for a technical aid agreement. The firms also reason that in the event that they are not selected as the company to execute a technical aid arrangement they will be in a position to exact royalties in the event that their inventions are used.

The extent of patent protection sought differs according to the industry in which the companies are involved and their traditional interest in the eastern European markets. Almost no applications for patents are being submitted in Yugoslavia, but what are regarded as fundamental inventions are being reduced to patents in Hungary, Rumania, and Poland, while in Czechoslovakia almost the entire repertoire of inventions normally protected in western Europe is subject to patents.

All of the companies interviewed confirm evidence from other sources that they do not take patents in the USSR except when explicitly requested to do so, pursuant to a technical aid contract with a Commissariat.[20] As we have already intimated,

[19] The companies involved have generously allowed their policies to be discussed, but for obvious reasons do not wish to have their identities disclosed.

[20] The number of patents taken out by Americans in the USSR in the period 1931-1934, the last period for which information exists, does not exceed 155. The figures are accepted by the United States Government.

patent relationships between this country, its nationals, and the Soviet Union are so few and so fugitive as to make it unnecessary to take up the position of the USSR in the live questions under discussion. The fact that there are not better technological relationships between the two countries should be investigated, but this problem is outside the confines of this paper.

By and large, American nationals are behaving in socialist countries as if governments will negotiate in a normal commercial manner for rights to their patented technology. And there is much to support their optimism. For some years to come, at any rate, the United States will be the principal source for improved *industrial* technology if only because of the volume of expenditure by government and business for research. The principal source for capital equipment in which such improvements will be incorporated will also be the United States. A government which adopted a policy of confiscating inventions of American origin, or which made frequent or arbitrary use of its compulsory licensing powers, would scarcely invite the confidence which it might require in order to put its industrial plant on a modern basis. Disregard of private foreign rights in inventions would, of course, not mean that the inventions were free to be used. The use of patents requires two assents: the assent not to sue the user, and the assent to pass on the know-how. The latter consent implies a peculiarly sympathetic relationship which does not thrive in an atmosphere of fiat or coercion.

Now if a government failed to treat patents according to the canons normally surrounding private property, the consequence would be that foreigners would not apply for patents in that country. This would not necessarily spell the termination of technological relations between the foreigner and the government. Technology often is, and in this case could be, taken out of the legal arena entirely, and instead of bargaining with the patent in the foreground, the transaction would involve the invention, its mode of manufacture, and the all important know-how. Under these circumstances the foreigner would drive a hard bargain; instead of a normal royalty return to run for the life of his monopoly, his price would be calculated on the basis of some estimated maximum use of his invention designed to recoup for the absolute loss of his invention. A government comparing the price asked with a royalty arrangement in effect in some other country would quickly discern the price of a no-patent policy. Indeed, some students have suggested that some Commissariat of the USSR perform such a calculation in the interest of estimating the cost of that country's ineffective patent protection for foreigners.

But, of the various factors tending to reenforce the expectation that governments with nationalized industry will deal fairly with the industrial property of foreigners, none is more relevant than the observation that these countries still in some measure maintain capitalist institutions. The extent of socialist enterprise varies in countries like Great Britain, France, Poland, Czechoslovakia, Rumania, and Hungary, but in

all of these countries there is present a sizable region of private ownership and, therefore, a recognized limitation on the principles of socialism. There are patents held by nationals of socialist states which the government recognizes as private property, and such practice may provide the crucial exception which may be applied to the patents of foreign nationals.

It would be foolhardy, however, to suppose that even compelling reasons for amicable patent relationships between socialist and capitalist states will necessarily cause them to take place. The importance of such relationships may be mutually recognized, but the larger political questions which divide eastern Europe from western Europe and the Americas may provide barriers to the movement of men, goods, and knowledge, to the disadvantage of all concerned. But prognostication on such issues goes beyond the bounds of this essay.

So far we have conjectured about the effect of nationalization on *future* patent rights held by foreigners. What effects has nationalization had on patents already issued to foreign nationals? It is obvious that at least three categories of patent rights are involved: (1) patents held by corporations in which American nationals enjoy stock participation; (2) patents owned by American nationals which have been licensed to a person or corporation doing business in the country; and (3) patents owned outright by an American national which have not been licensed.

The effect of nationalization on existing patent rights is confined to eastern Europe, including Czechoslovakia. The limited nationalization plans in France and Great Britain have not affected the titles of American nationals to their issued patents.

Corporations in which Americans have a substantial stock interest have been nationalized along with all assets in the form of patents by the governments of Rumania, Czechoslovakia, Poland, and Hungary. In a number of cases the nationalized corporation was held by American nationals through the medium of a German-domiciled corporation, and this has given rise to a range of controversy turning on the question whether the seizure constituted an act directed against "enemy" property or, in fact, involved the confiscation of private property owned by American nationals.

In a number of cases corporations nationalized by eastern European governments have been licensees under patents owned by Americans in the local jurisdiction. The laws and ordinances pursuant to which confiscation took place leave little doubt that the government has assumed control over the licenses, but there is no evidence that the seizure runs to the patent itself.[21]

As far as is known to this writer, patents owned by American nationals which had not been licensed at the time of nationalization have not been affected by socialization legislation.

The public policy issues which face our government as a result of the nationali-

[21] Mention should also be made of a sizable group of American-owned patents in eastern Europe which were licensed or assigned to German corporations doing business in eastern Europe. These patents have as a rule been seized by local custodians of enemy property.

zation of American property in general and patents in particular are confounded by the alleged presence of "enemy interests" in the properties. To this phase of the issue this paper can make no contribution, since it is a matter still under negotiation with the governments involved. Policy is clear, however, when there is agreement between the governments that the property nationalized contains a bona fide American interest. The position of our State Department has been to request adequate and effective compensation for the confiscated property, and such an obligation is typically acknowledged by the nationalizing government in its enabling legislation. It may be anticipated that there will be protracted discussions of what constitutes "adequate compensation," in what medium the compensation shall be paid, and so on.

Such policy fits the circumstance where the American patent is an asset of an American-owned corporation. What of the situation where a license under an American-owned patent, once enjoyed by a private corporation, has now passed to a government? Here equity may be served by allowing the license agreement to proceed under its old terms. But such continuance will be feasible only in the case of the simplest royalty arrangements; if, as often happens, the passage of rights to patents is contingent upon reciprocal access to the licensee's existing and even future technology, there is no way out except closure of the contract for a monetary settlement.

VII

The persistence of the patent system amid cataclysmic shifts in our economic system—in our own time the advent of nationalization—testifies to the hardiness of the institution. The letters patent emerged in the fifteenth century; the device survived the latter days of feudalism and merged with the objectives of the economy which we designate as mercantilism. Within this system, which persisted from the sixteenth to the middle of the eighteenth century, letters patent served as a visa for alien crafts and craftsmen in their journeys into the would-be self-sufficient Realm. With modification but with unchanged essence, the patent, which under mercantilism served as an instrument of autarchy, became an enabling franchise for vendors in the free-trade economy which characterized the period from the latter half of the eighteenth century to the beginning of World War I. The neo-mercantilism which marked the period between the two world wars has not diminished the vigor of the patent system. Now with the advent of socialism we observe another phase in its career. Perhaps some day a student will write of the resiliency of the patent institution.[22]

[22] Dr. Heinrich Kronstein in this symposium has made an important contribution to the history of the patent system in relation to wider economic events. But there is room for more ground-breaking.

PROPOSED MODIFICATIONS IN THE PATENT SYSTEM

WILLIAM H. DAVIS*

GENERAL CONSIDERATIONS

Patents for inventions in this country are Federal grants to the first inventor for seventeen years of the exclusive right to make, use, and sell the patented invention. They are based on the Constitutional provision[1] that to promote the progress of science and useful arts Congress shall have power to secure to an inventor for a limited time the exclusive right to his discovery.

The patent grant is an incentive essentially material in its nature, offered to induce the inventor to disclose his invention rather than keep it, or try to keep it, a trade secret. This purpose, to substitute disclosure for secrecy, has always been emphasized by the courts and by jurists as the prime purpose of the grant.

The grant has been regarded as a contract in which the price paid by the inventor is the disclosure of his invention and the price paid by the government on behalf of the public is the assurance that for seventeen years no one will be permitted to make use of the invention without the patentee's consent. This concept demands of the patentee a full and frank disclosure and from the representatives of the public it calls for good faith and diligence in all matters that affect the assurance to the inventor of the exclusive right to the thing he has truly invented and fully disclosed. Thus, that patents shall be granted only for things which the inventor has in fact originated and fully disclosed and that the protection of the patentee's exclusive right shall, in such cases, be prompt, sure, and reasonably inexpensive, are requirements inherent in the very nature of the system.

These broadly generalized considerations applicable to any system of patents for inventions afford criteria by which to judge the quality and the administration of patent laws at any particular moment. They serve as guiding principles in any inquiry as to the wisdom of suggested modifications of our patent system.

The effectiveness of an incentive, whether material or spiritual, depends not upon theoretical judgments of the offeror, however well intentioned, but upon acceptance by the individual to whom the incentive is offered. The offer must be brought home to the individual and the nature of the incentive needs to be such as to arouse in him some eagerness to accept it in preference to other alternatives. A material incentive particularly needs to be concrete and not too long deferred. It is well to bear these requirements in mind when giving consideration to the provisions and the practical administration of our patent laws.

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[1] U. S. CONST., Art. I, §8.

The basic provisions of our patent laws—the offer of a seventeen-year monopoly in exchange for full disclosure—and the basic Patent Office procedures have remained substantially unchanged for more than a century. By some this fact is put forward as evidence of virtue; by others as evidence that these principles and procedures now need to be reformed. Probably neither of these assumptions would withstand close examination or serve as a useful guide to sound conclusions. That within the century there have been significant changes in the character of our industrial society and particularly in the relation of the individual inventor to the progress of applied science and useful arts is clear. It is a commonplace remark that we have passed from a stable society to an adaptive one. It is within the memory of living practitioners of patent law that a principal burden of the inventor who sought to introduce into practice a substantial innovation in the useful arts was to get anyone to listen to him and to take the risk of changing from established practice to his proposed innovation; while today, particularly perhaps in the newer fields of industry, it is more probable that his innovation will be seized upon by everyone in that line of manufacture before he can get it patented or make any adequate arrangements to protect the exclusive right that the law offers him in consideration of his disclosure. Where, in the last century, the individual inventor was likely to have to develop his invention for market on his own account, or to cooperate in its development with his local employer with whom he was on terms of intimate association, today the inventor is more likely to be an employee who has agreed as a condition of employment to assign his invention to his employer, or he is one of an organized research group employed to invent and in eager competition with other organized groups to make the innovation and get it on the market.

To this outline of changed relationship there are, of course, exceptions, and in any event the individual inventor is still the ultimate source of the patentable invention, the mainstay of innovations and the recipient of the patent grant. But I think all those acquainted with inventions in modern industry will be inclined to elaborate upon this change rather than to question or minimize it. It reflects itself at every turn in the consideration of our patent system as of today, whether we are considering the fundamental provisions of the patent law in relation to its constitutional purpose or the everyday details of Patent Office practice and court procedures.

At this point acceptance by the reader of two basic thoughts well be assumed: (1) that in our modern industrial economy based on the principle of free enterprise it is important to assure a continuous flow of technological improvement, and (2) that the grant of a monopoly for a limited time in consideration of full disclosure is the best available method of assuring such a flow of technological improvement. Later on, in discussing the question of patent abuses and the conflict between the idea of a patent monopoly for invention and our general notions as to free competition, the broader question of the soundness of these assumptions will be considered.

When evaluating our patent system by any chosen criterion, we should never

forget that the patent monopoly is granted not for new ideas in general but only for new and useful inventions in the applied sciences and useful arts: an "art, machine, manufacture, or composition of matter," as the patent statute puts it; and then only when the idea has been embodied in operative form suitable for practical use. By the grant the patentee gets a right which the inventor does not naturally possess—the right to exclude others from the use of ideas which they have learned from him or discovered for themselves—and there is a corresponding encroachment upon the natural rights of others.

Such a system demands clarity of definition and avoidance of mistake in the grant, prompt action and simplicity of procedure in the granting, and surely available methods of enforcement. It needs to be free from "concealed liens and unknown liabilities to lawsuits and vexatious accountings for profits made in good faith," to use the apt expression of Mr. Justice Bradley.[2]

These requisites of a sound system of patents for inventions in an economy of free enterprise have been recognized from the beginning even in the early days of relative stability in our industrialized society. Their importance has increased in direct proportion to the increase in complexity of manufactures and in the tempo of technological innovation that has accompanied the transition to a vastly more adaptive mode of life. The change in the environment of the patent system has thus emphasized the importance of clear definition, simple and prompt procedure, and surety of enforcement.

Unfortunately, it has to be admitted that in fact we have moved in the opposite direction since the early years of the twentieth century. Instead of progress we have witnessed retrogression. This fact need not, however, give occasion for despair. On the contrary, it affords an opportunity for correction that could, at this critical moment in our industrial life, quite definitely and quite significantly promote the progress of science and useful arts.

PATENT PROCEDURES

The principal trouble afflicting our patent system today is obesity. The patent system is suffering from fatty degeneration. It needs to be thinned down and toughened up; streamlined is the appropriate word.

At a time when the increased tempo of technological innovation calls more and more insistently for a minimum of delay in the issuing of patents, the backlog of the Patent Office is greater than ever before, and is growing like a vigorous banyan tree. New patent applications are being filed in the Patent Office at a rate twice that of 1943, and more than 50 per cent higher than the average of the five years immediately preceding the war. The Patent Office is trying to meet this rapidly increasing load with a depleted force of patent examiners and is failing to do so. In the first five months of 1946 the Patent Office backlog climbed without interruption to more than two and one-half times what it was in 1942. There were over 100,000 applications and amendments awaiting action by the examiners, and the average de-

[2] Atlantic Works v. Brady, 107 U. S. 192, 200 (1882).

lay in reaching an application which was ready for examination was nearly one year. Since then things have not grown appreciably better.

The situation is one of critical emergency. It calls for prompt administrative action and for increased Patent Office appropriations. It cannot be permitted to continue very long without a breakdown. The emergency action required will no doubt be forthcoming, but the situation requires more than emergency action. It indicates the need of basic reforms in Patent Office equipment and procedure.

The fact is that only relatively small expenditures, as governmental administrative expenditures go, would be required to transform the Patent Office into a highly useful and significant repository of industrial technology, immediately and easily available to the general public and to those interested in opportunities for profitable investment. The Patent Office could be made a major factor in keeping up the supply of profitable investment opportunities which our industrialized economy demands if it is to be kept in good health and vigor. And there has never before been a time in our history when the health and vigor of our industrial system was so important.

In recent years some steps have been taken by Congress to aid the Patent Office by legislative changes in the Patent Office setup or procedure. The Act of 1927,[3] creating the Board of Appeals, and the Act of 1939,[4] cutting down the times allowed to applicants for taking action in the Patent Office and simplifying the interference procedure, and certain changes in the Patent Office rules governing interferences, introduced in 1934, have now had time to show what results can be expected of them. They did have some temporary effect in reducing the average time that it takes to get a patent application through the Patent Office, and they have had an important permanent effect in eliminating the very long pendency of particular patent applications which had existed in the past. But, nevertheless, the rapidly growing backlog of the Patent Office confronts us. It is clear that more far-reaching reforms are required.

One legislative reform that has been proposed and has met with pretty general approval is the so-called "Twenty-year Bill," which would provide that no patent shall in any event have a term longer than seventeen years and all patents shall expire at a date not more than twenty years from the date when the application was filed, with limited discretion in the Commissioner of Patents to make allowance of not more than two years from the filing date for unavoidable delays not chargeable to the applicant. The enactment of this bill could be expected to put pressure on the applicant and the Patent Office, and even on the appropriations committees of the Congress, to exert themselves to speed up the issuance of patents.

A more direct attack, aimed at a reduction of the load on the Patent Office, has been proposed. It is well known that a great many patent applications are filed, particularly by industrial corporations but not only by them, in cases where the

[3] 44 STAT. 1335, 1336 (1927), 35 U. S. C. §7 (1940).
[4] 53 STAT. 1212-1213 (1939), 35 U. S. C. §§52, 57, 59(a), 63 (1940).

owner of the innovation does not really want or expect to exercise a monopoly. These are the so-called "defensive" patent applications. The idea is to preempt the field not for the purpose of exercising a monopoly but for the purpose of preventing the issuance to someone else of a "nuisance" patent on the innovation. Unfortunately, the mere filing of such an application does not give the applicant the defensive protection he wants. Because of certain evidentiary rules built up by the courts over a long period of years, the applicant does not get the defensive protection unless the application issues as a patent. The result is that industry and the Patent Office are burdened with prosecution of these applications to final allowance, even though no one expects that the issued patent will, or intends that it shall, perform the normal function of a patent; that is, secure to the patentee a monopoly of the manufacture, use, and sale of the innovation. Applications of this type tend from their very nature to lie in the vague and misty borderland between patentable invention and unpatentable application of mere mechanical skill, so that the patents issued on these applications are peculiarly likely to be of the type that never should be issued by the Patent Office at all. Although it is impossible to get accurate figures, it has been estimated that these so-called "defensive" applications amount to a very large percentage, perhaps as much as one-third, of all patent applications. It has been proposed that this burden be lifted from the Patent Office and from industry by authorizing the applicant to abandon the application after a first action by the Patent Office and after complying with requirements of the Commissioner as to form, and that an application so abandoned would be published and would have the same evidentiary effect now attributed to the filing of a patent application which eventually results in an issued patent. This suggestion is worth very careful consideration. It may be a feasible way to reduce very substantially the load on the Patent Office.

A great deal of thought and discussion has been devoted to numerous suggestions for further simplifying interference procedure in the Patent Office. This is a difficult and technical subject and there seems to be no clear consensus about it within the patent bar or among industrialists particularly interested in the ownership and exploitation of patented inventions. Interferences arise out of the provision of our law that the patent monopoly must be granted only to the first inventor. In the required definition of the claimed invention, interference proceedings need the specialized administrative knowledge of the Patent Office and, at the same time, in ascertaining which of two or more applicants first invented the thing, they involve the trial of peculiarly difficult questions of fact. Perhaps eternal vigilance, adequate personnel, and wise administrative practices are the only things that will achieve success in this field.

One bottleneck in the Patent Office as it is now functioning is the Board of Appeals, which got so far behind in its work that hearings were not set for more than a year after filing of the appeal, and which finally suspended the setting of hearings on appeal altogether until it could clear away its accumulated business. This situation may perhaps, be ameliorated by recent legislation which temporarily

augments the personnel of the Board, but it cannot be cured in that way. Its existence reflects more fundamental trouble than mere shortage of personnel. It evidences too great a gap of understanding and too much inconsistency between the Board of Appeals and the primary examiners.

The position of the primary examiner in the Patent Office is a key position from the administrative point of view. Everything should be done to make it possible for the primary examiners to administer their respective divisions effectively, to relieve them of unnecessary detail, and to support their actions. They are the line commanders in the battle for efficiency and effectiveness in the Patent Office. They should have the trust and confidence of their superiors, they would seem to be entitled to clear and definite orders from higher up, and they should be supported by a staff adequate to enable them to concentrate their attention on their primary function—the correct determination of the novelty and patentability of the patent applications acted upon by the assistant examiners in their divisions.

It seems quite clear that the present congestion in the Patent Office Board of Appeals, the long delay in its review of the decisions of the examiners, and the fact that today the decisions of the Board of Appeals are not adequately published, all tend to reduce the authority and responsibility of the primary examiners.

It is an anomaly in our patent system that appeals from the decision of the Board of Appeals of the Patent Office may follow either one of two courses, as the dissatisfied applicant may choose. He may either appeal to the Court of Customs and Patent Appeals, on the record made in the Patent Office, or bring a bill in equity in a Federal district court.[5] It has been suggested that the appeal to the Court of Customs and Patent Appeals, an administrative procedure, should be eliminated. Statistical studies and informed opinion indicate that such change could be expected to result in a significant reduction in the number of appeals and that it would also contribute to clarity and uniformity in the actions of the Patent Office examiners and the Patent Office Board of Appeals.

Finally, a basic deficiency in the operation of the Patent Office, which is all the more deplorable because if it were remedied the Patent Office could do a service to American industry of really tremendous value, is that the Office grants too many invalid patents. The two main functions of the Patent Office are to serve as (1) a publicly accessible general repository of industrial technology, and (2) an effective check upon the granting of improper patents. These two things go together. The examiners cannot serve as an effective check upon the granting of improper patents unless they are equipped with an up-to-date and easily accessible record of the state of applied science and useful arts. In this respect the Patent Office is markedly deficient. And yet without very great additional expense it would be possible to equip the examiners with that access to the knowledge of the art which is an indispensable tool for efficient and effective discharge of their duties. In these days, when so much emphasis is being put upon research and when it becomes more and

[5] REV. STAT. §4915 (1875), as amended, 35 U. S. C. §63 (1940).

more difficult every day for an interested person to keep up with current knowledge in any special field, it seems clear that the Patent Office, which deals with the practical application of scientific knowledge and useful arts, should be equipped with a repository of information about the applied sciences to which not only the Patent Office examiners but the general public could resort with full assurance that it is complete and up to date. It is possible to create and to maintain such a collected body of knowledge in the Patent Office if the job is undertaken diligently, with adequate appropriations, and with the determination to make use of all the modern conveniences for creating and for making easily available such a collection. The present equipment in the Patent Office falls very far short of that ideal.

In the field of judicial interpretation and administration of the patent laws by the Federal Courts, considerable thought has been given to the delays, uncertainties, and costliness of patent litigation and to the very considerable gap that seems to exist between the Patent Office and the courts as to what is patentable subject matter. The principal suggestion now current in this field is the creation of a single court of patent appeals to take over, subject to review by the Supreme Court on certiorari, the final jurisdiction in patent litigation that is now divided among the ten Circuit Courts of Appeals and the Court of Appeals of the District of Columbia.

This suggestion has been under discussion for many years. There are two schools of thought. One regards the suggestion as a wise and necessary thing to eliminate the conflicts, uncertainties, and multiplication of litigation on particular patents that now prevail. The other fears that separation of the judicial process in patent cases from the general body of our Federal system would tend to isolate the court from those contacts with human and commercial problems which keep the judicial vision broad, and would lead to technical and narrow attitudes and judgments destructive of what should be a living and dynamic system, capable of adjusting itself to the current requirements of a free enterprise economy.

Among many suggestions that have been made as to how these two points of view might be reconciled, perhaps the most carefully considered one is that the proposed single court of patent appeals should have not more than two permanent judges, one of whom would be chief judge, and that the other judges should be designated from time to time, for temporary service, by the Chief Justice of the United States from the Federal judiciary, the temporary judges being in the majority in every case. In this way it is hoped to secure the uniformity, finality, and reduction of litigation sought for, and at the same time to retain the beneficent effects of the broader judicial experience to which the whole body of Federal judges is continuously exposed.

DOES THE PATENT LAW CONFLICT WITH THE ANTITRUST LAWS?

A great deal has been said and written about the question whether, and to what extent, and how and why, the monopoly granted under patents for inventions is in conflict with the antitrust laws Yet it can hardly be doubted that if a poll were

taken of public opinion in this country on the two questions, "Do you think the patent laws ought to be repealed?" and "Do you think the antitrust laws ought to be repealed?" there would be an overwhelming negative answer to both questions. The American people have always liked the idea of inventions and patents for inventions, and at the same time they have always liked the idea of free competition and unrestrained trade. Nevertheless, for many years, and in great volume, we have had, without much reconciliation, and with little conclusive result, a rather violent discussion of the alleged encroachment of the patent laws upon the purpose and effect of the antitrust laws—the so-called "patent abuses." To review this discussion would require a volume in itself, and it will not be undertaken here. The point of view from which this article is written is that there is no necessary conflict between these two long-established concepts of American life; that, on the contrary, if properly administered, they complement and support one another. Yet it cannot be denied that patents have been made use of as elements in the building up of combinations and conspiracies in restraint of trade which have violated the antitrust laws, and that the patent privilege has sometimes been projected beyond its legitimate scope to interfere with the free flow of commerce in unpatented articles and materials.

There can hardly be any doubt that the possibility of such abuse or misuse of patent rights is very substantially increased by the current obesity of our system of issuing patents and of interpreting and enforcing patent rights. The possibility of abuse might be quite different if we had a patent system in which patents were promptly issued only for patentable inventions and could be adjudicated and enforced quickly and at minimum expense. As a practical matter, we shall doubtless always have to deal with a system that is far from perfect, although we are entitled to look forward to a substantial improvement over present conditions if public opinion can be aroused to a point where that improvement is unequivocally demanded.

In the meantime, we can and we should segregate in our thinking abuses which may arise out of defects in our system of issuing and enforcing patents or out of defects in the patent grant itself from those abuses which result from license agreements, contracts, and combinations entered into by patent owners.

It is as true of owners of patents as it is true of the owners of other property, that they are forbidden by the antitrust laws to enter into any contract, combination, or conspiracy in restraint of trade, or to monopolize or attempt to monopolize any part of trade or commerce beyond that limited monopoly secured to them by existing patents. Within this area of combination encroaching upon the territory forbidden by the antitrust laws, the patent laws afford no protection. Such conduct can be prevented by enforcement of the antitrust laws, and calls for no change either in the antitrust laws or in the patent law, unless Congress, having regard to the constantly growing body of judicial application of the antitrust laws to such situations, should conclude that for the sake of certainty and clarity, and as a mat-

ter of administrative efficiency, it would be desirable at one point or another to define more specifically items of conduct involving patents which are or are not within the prohibition of the antitrust laws.

If, with whatever risk of over-simplification may be involved, it should be assumed that the antitrust laws are an adequate safeguard against all bilateral contracts, combinations, or conspiracies in restraint of trade where patents are involved, yet the fact would remain that a patent monopoly may give the owner a unilateral power, either without any specific contract or by means of patent licenses which are in substantial effect unilateral, to interfere with the free flow of commerce in things which lie outside of the patent monopoly.

It has, of course, always been the function of the Federal courts to restrict the monopolistic activities of the patent owner to an area which does not go beyond the proper limits of a patent grant. It is for this purpose that the statute requires that the scope of the monopoly should be particularly pointed out and distinctly claimed in the patent, and that the courts have been called upon to pass upon the validity of patents and upon questions of infringement. And throughout the history of the administration of the patent law, specific questions have repeatedly arisen as to whether and to what extent the patent owner may make use of his monopoly to restrict a licensee or purchaser in the manufacture, use, or sale of unpatented things. The result has been to build up a large body of judicial interpretation. Particularly in recent years the Supreme Court has developed a line of cases condemning unilateral uses of patent monopolies to restrain or interfere with the free flow of commerce in unpatentable articles, materials, or industrial practices; and as part of this more recent development the Court has evolved the judge-made rule that a patentee who has so abused or misused his monopolistic rights is debarred from exercising those rights until the patent owner can show that he has "fully abandoned" the improper use and "that the consequences of that practice have been fully dissipated."[6]

This case-by-case judicial evolution of restrictions upon the activities of patent owners has been contemporaneous with growing concern about our patent system from two opposed points of view. At the one extreme are those who conclude that free competition calls for abolition of the patent laws, and at the other extreme are those who regard these restrictions with terrified alarm as destructive encroachments upon the patent monopoly.

So far as the more reasonable body of opinion is concerned, it would perhaps be possible to find agreement on at least two principles: (1) that it is desirable, and consonant with the mores of the nation, to foster competition in the production of and among patentable inventions, and (2) that any restriction upon the exclusive right to make, use, and sell that characterizes the patent monopoly reduces the incentive of the grant and so tends to discourage disclosure and reduction to practice of technological innovations and to encourage secret trade practices in prefer-

[6] Carbice Corp. of America v. American Patents Corp., 283 U. S. 27 (1931).

ence to disclosure, so that all excessive or unnecessary restrictions are dangerous in themselves.

It is clear that dividing lines in this field cannot accurately be drawn merely on legal considerations. Their location depends rather on the answers to practical economic questions in our complex and vigorous industrial structure. Unfortunately, there is a marked deficiency of real knowledge of the factors that determine the answers to these practical questions. The tendency has been rather to resort to emotionally inspired guesses, or even dogmatic assertions, both in and out of court.

Out of this situation arises a very serious question whether we should continue to rely upon the gradual, step-by-step development of these lines of demarcation by judicial process or make a carefully studied legislative attempt to define more explicitly and with more assurance of stability those activities of patent owners in the borderland of dispute that are acceptable and those that are forbidden. It would, of course, be possible to conduct this sort of rule making partly by legislative action and partly by a duly authorized and instructed administrative tribunal. The Clayton Act and the Federal Trade Commission Act are suggestive precedents.

COMPULSORY LICENSING

As a cure-all for the abuses of the patent system, general compulsory licensing, with royalties to be fixed by the Federal courts if necessary, has been suggested. It seems clear, however, that the suggestion is inappropriate in an industrial system that rests, as ours does, on private enterprise. General compulsory licensing, on final analysis, is seen to be in fact a bounty system, not one based upon a grant of exclusive rights. Where the government owns and finances in any industry the creation and use of productive facilities, a system of compulsory licensing, or even the elimination of all patent rights with adequate provision for compensation by awards or bounties, is appropriate. It is in effect the policy which has been adopted by our Government under the Act of 1910[7] and under the Atomic Energy Act[8] with respect to manufacture by or for the Government.

But it seems quite clear that such a plan is wholly inappropriate to a system of private enterprise and investment. It needs but little knowledge of the magnitude, complexity, and dynamic character of technological innovation in our industrial life and of the limitations of democratic government to convince anyone that the administrative difficulties of a bounty system, substituted for the patent law, are insuperable; and a system of general compulsory license is essentially a bounty system.

This does not mean, however, that compulsory license under patent grants is never desirable. We already have it in more areas than one. Compulsory licensing has existed since 1910 with respect to use for or by the government. It is recognized by the Supreme Court as an appropriate means to correct an unlawful

[7] 36 STAT. 851 (1910), 35 U. S. C. §68 (1940).
[8] 60 STAT. 755, 42 U. S. C. A. §1801 (Supp. 1946).

monopolistic situation that has been built up in violation of the antitrust laws. The Federal courts have always had, and have often exercised, the discretion to withhold an injunction, even under a favorably adjudicated patent, where public health or safety is involved or where very special circumstances make the issuance of an injunction an excessive hardship for the defendant without just or substantial benefit to the plaintiff.

Nor have we yet heard the last word on the much-discussed subject of compulsory license in cases of continued and unjustified failure or refusal of the patent owner to use or license the patented invention. William C. Robinson, in his *The Law of Patents for Useful Inventions*—perhaps the most profound study of our patent system ever made—very justly pointed out as long ago as 1890,[9] in criticism of the rule which then prevailed and still prevails, that the inventor does not fulfill the spirit of his contract or conform to one great object of the patent privilege unless he introduces his invention into actual use and puts its benefits within the reach of others. From that time to this, discussion of the question of compulsory license as a remedy for non-use has continued. The question, on close examination, presents many difficulties and calls for a careful balance of good and evil. Yet the basic considerations mentioned by Mr. Robinson seem to have kept the discussion alive, and it seems probable that this question of compulsory license for non-use will never be settled until it is settled right. Perhaps a solution could be found in a statutory definition of the circumstances under which non-use would or would not be regarded as an abuse of the patent privilege and a ground for compulsory license.

[9] 1 ROBINSON ON PATENTS 64-65 (1890).

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